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HYTEMPITE

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The "Standard for Comparison" in High Temperature Cements is used by hundreds of Gas Companies for new fire brick construction, patching and repairs to Refractory linings.

Makes Strong, Thin, Tight Joints

Patching hot retorts with HYTEMPITE

HYTEMPITE is used in the Gas Plant to lay up fire brick, make quick repairs without letting down the ovens, patch retorts and make them gas tight, stop leaks, hot patches, fills large cracks, saves fire brick and increases the life of the lining; used also for Jamb Joints of Coke Ovens.

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THE QUIGLEY REFRACTORY GUN

fills cracks, repairs furnace walls, arches, baffles, retorts, jamb joints of coke ovens, surfaces new walls, builds baffles, etc. Also applies stucco, plaster, paint, etc.

It shoots plastic mixtures with great velocity, so that patches stick where hand troweled ones might fail to hold. Operates by compressed air. One Public Utility writes: "The Quigley Gun saved us $2,800.00 in a few weeks." Send for Booklet RGJ.

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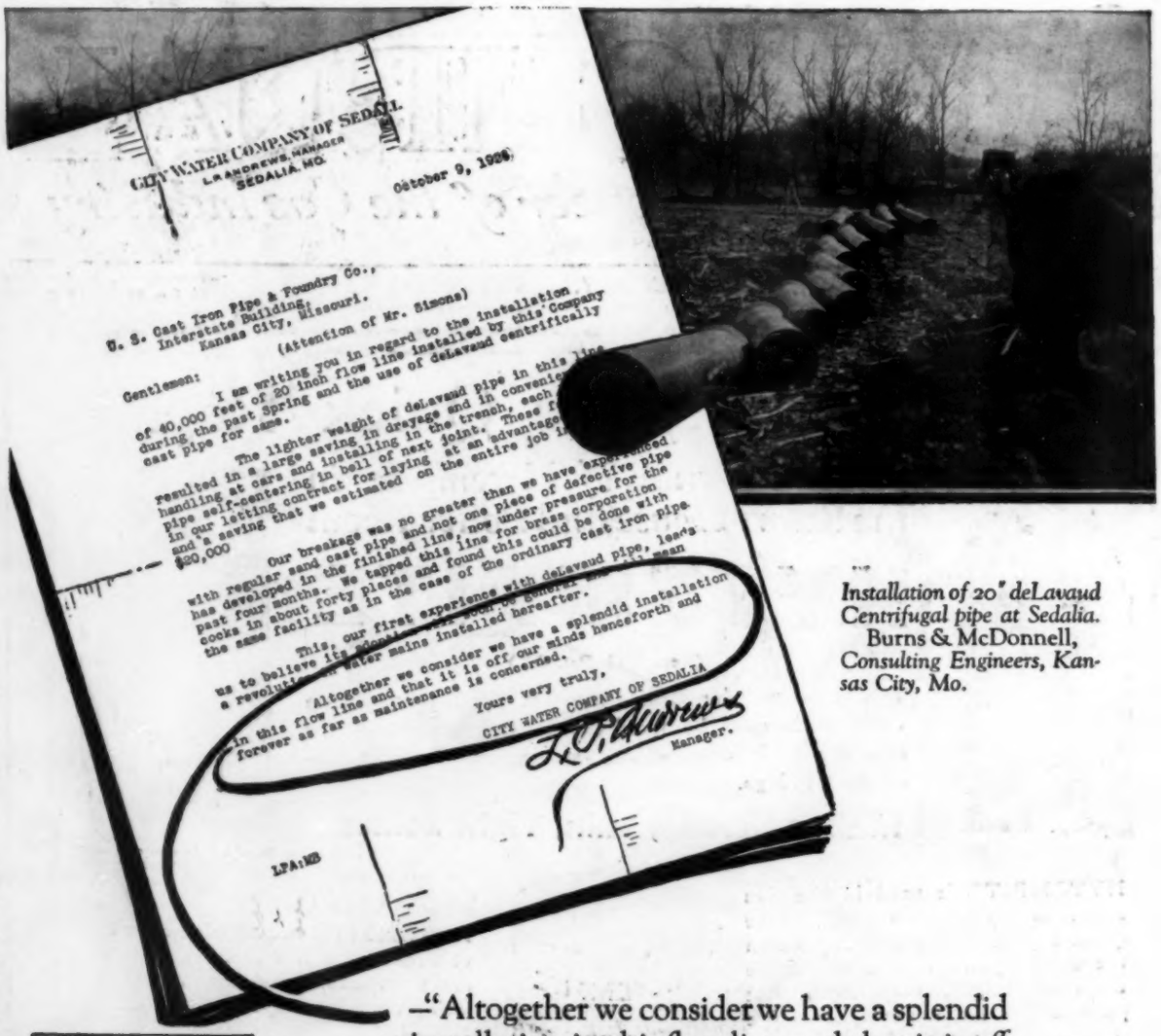
26 Cortlandt Street New York City
Distributors with stock and service men in every Industrial Center

Advertising Index, page 59 Index to Contents, page 4



CITY WATER COMPANY OF SEDALIA
L. A. ANDREWS, MANAGER
SEDALIA, MO.

October 9, 1926.

U. S. Cast Iron Pipe & Foundry Co.,
Interstate Building,
Kansas City, Missouri.

(Attention of Mr. Simons)

Gentlemen:

I am writing you in regard to the installation of 40,000 feet of 20 inch flow line installed by this Company during the past Spring and the use of deLavaud centrifically cast pipe for same.

The lighter weight of deLavaud pipe in this line resulted in a large saving in drayage and in convenient handling at cars and installing in the trench, each pipe self-centering in bell of next joint. These features in our letting contract for laying at an advantage and a saving that we estimated on the entire job [illegible] $20,000

Our breakage was no greater than we have experienced with regular sand cast pipe and not one piece of defective pipe has developed in the finished line, now under pressure for the past four months. We tapped this line for brass corporation cocks in about forty places and found this could be done with the same facility as in the case of the ordinary cast iron pipe.

This, our first experience with deLavaud pipe, leads us to believe its [illegible] water mains installed hereafter.

Altogether we consider we have a splendid installation in this flow line and that it is off our minds henceforth and forever as far as maintenance is concerned.

Yours very truly,

CITY WATER COMPANY OF SEDALIA

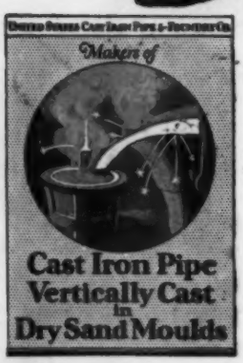
L. A. Andrews
Manager.

LFA:MB

Installation of 20" deLavaud Centrifugal pipe at Sedalia.
Burns & McDonnell,
Consulting Engineers, Kansas City, Mo.

—"Altogether we consider we have a splendid installation in this flow line and that it is off our minds henceforth and forever as far as maintenance is concerned."

Write for special literature covering specifications, uses and manufacture of deLavaud Centrifugal pipe.



United States Cast Iron Pipe and Foundry Company

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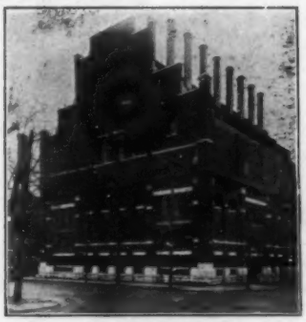
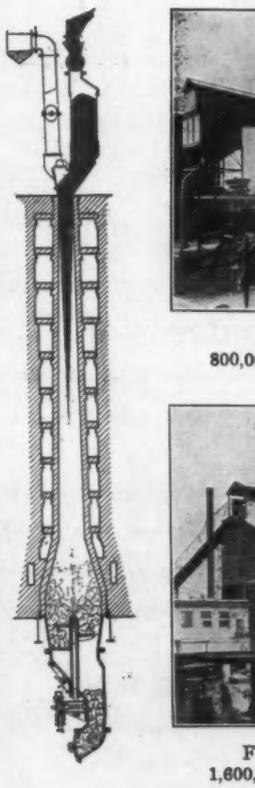
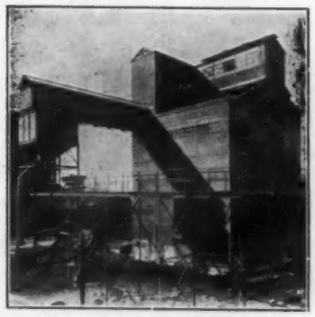
GLOVER-WEST *Vertical Retorts*

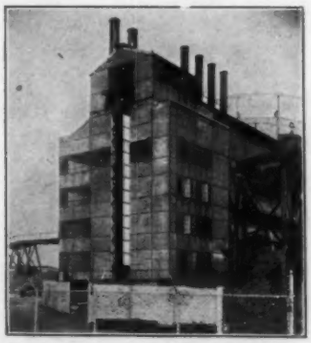


Toronto, Ont.
5,000,000 cu. ft. per day

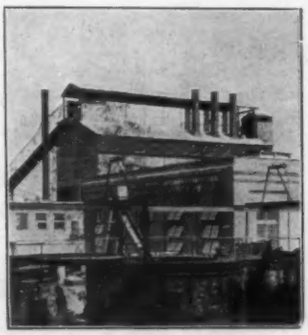




Fargo, N. D.
800,000 cu. ft. per day



Portland, Me., 2nd Plant
750,000 cu. ft. per day



Fall River, Mass.
1,600,000 cu. ft. per day

Views of Plants *Completed* in 1926

Also Completed

Stamford, Conn.	1,100,000 cu. ft.
Buenos Aires	3,500,000 cu. ft.

Under Construction

Springfield, Mass.	2,800,000 cu. ft.
Toronto, Ont. (ext.)	600,000 cu. ft.
Santiago, Chile	3,000,000 cu. ft.

WEST GAS IMPROVEMENT CO.

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American Gas Journal

SIXTY-SEVENTH YEAR

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Some Facts About "Food Shrinkage"

Tests and data on various gas ranges

I. V. Brumbaugh
Research Laboratory, American Stove Company

THERE are some manufacturers of gas ranges who are advertising quite extensively that foods cooked with ranges of other manufacturers shrink much more than when cooked with the ranges made by them. Most of these advertisements erroneously lead the reader to believe that all foods shrink during the cooking process.

Claims have been made by manufacturers that foods lose as much as 8 per cent in weight when cooked with other types of ranges, than when cooked with their own type of range.

It has been observed that the greater number of manufacturers who claim "less shrinkage of food" are those who make the "fireless cooker type of range."

What Recent Tests Show

Some recently published tests show that an average saving of 1 pound 2 ounces of food per meal was obtained by a fireless cooker type of range as compared with other types of ranges.

In another instance, the results of tests are being advertised which show a loss from food shrinkage of only 7 per cent during the cooking of a meal with a fireless cooker type of range, while cooking the same kinds of food with a range having an oven heat regulator shows a loss of 19 per cent.

In other words, the manufacturer claims that the loss from food shrinkage was over 2½ times as much with the competitor's range as with their own make. Some of the foods that were cooked to make the comparison were prunes, peaches, lima beans, and potatoes.

The advertisement shows that the loss in weight of these foods with the two different types of ranges was as follows:

	Fireless Cooker Type of Range	Range with Oven Heat Regulator
Prunes	½% Loss	13½% Loss
Peaches	2½% "	14½% "
Lima Beans	4 % "	19½% "
Potatoes	23 % "	32 % "

The above figures indicate that all of these foods lost weight on being cooked. Also, that the loss in weight was always less with the fireless cooker type of range.

The research laboratory of the American Stove Company has made an extensive study of "food shrinkage."

Different types of ranges were tested, using different kinds of foods to determine if the design of the range in any way affected the shrinking of foods during cooking.

It seemed rather surprising that dried fruits and dried vegetables should lose weight on being cooked.

When the same kinds of food are cooked in covered utensils, it did not seem possible that there should be any difference in the loss of weight with different types of ranges, if each food was cooked in the proper manner by all the ranges.

Prunes, peaches, lima beans, and boiled potatoes increased in weight instead of losing during cooking.

Preparing Food for Test

The prunes, peaches, and lima beans were weighed and then soaked in water over night before being cooked. Most cooking authorities recommend that dried fruits and dried vegetables should be soaked in water for this length of time.

The following morning the water was completely drained off of these foods before they were weighed in order to find out how much water each kind had absorbed.

The water was then added and the foods were cooked according to the instructions supplied with each range. At the end of the cooking period, the water (juice) was again completely drained off before weighing to ascertain if the cooking process had changed the weight of the solid food.

The following tabulation shows the weight of the uncooked foods, their weight after soaking, and their cooked weight:

Uncooked Weight	After Soaking Overnight	After Being Cooked by a Fireless Cooker Type of Range	After Being Cooked in Oven Controlled by a Heat Regulator
Prunes (Santa Clara)			
2 Lbs.	2 Lbs. 14 Oz.	2 Lbs. 14½ Oz.	2 Lbs. 15 Oz.
Peaches (Calif.)			
2 Lbs.	4 Lbs. 2 Oz.	4 Lbs. 3½ Oz.	4 Lbs. 3½ Oz.
Lima Beans (Calif.)			
2 Lbs.	4 Lbs. 6½ Oz.	5 Lbs. 1½ Oz.	5 Lbs. 2 Oz.
Potatoes (Burbank)			
2 Lbs.		2 Lbs. 7½ Oz.	2 Lbs. 6½ Oz.

The above tabulation shows that prunes and peaches increased slightly in weight during cooking; also, that the increase in weight of lima beans and boiled potatoes was quite pronounced.

It is of interest to note that soaking the peaches and lima beans caused them to more than double their original weight because of the water they absorbed.

The per cent of increase in weight, during cooking of prunes, peaches, lima beans, and potatoes, was as follows:

	Fireless Cooker Type of Range	Range with Oven Heat Regulator
Prunes	1 % Increase	2 % Increase
Peaches	2½% "	2½% "
Lima Beans ..	15½% "	16½% "
Potatoes	*23½% "	20½% "

* Potatoes were slightly soggy.

Three very important conclusions are readily derived from these figures, namely:

1. Dried fruits (prunes and peaches), dried vegetables (lima beans), and boiled potatoes do not lose weight during cooking.

2. The increase in weight of these foods during cooking is not appreciably different with either a fireless cooker type of range or a range having an oven heat regulator.

3. Advertising, which shows that ranges equipped with oven heat regulators cause a loss in weight during the cooking of these foods, is not essentially correct.

Foods like roast pork, candied sweet potatoes, baked apples, indian pudding, etc., decreased in weight during cooking with different types of gas ranges.

Approximately the same quantity of each kind of food was cooked in the ovens of five different makes of gas ranges. The oven of one of the ranges was of the fireless cooker type. The ovens of the other four makes of ranges were of the ventilated type, which is the kind of oven most widely used. Each of these ventilated ovens (Ranges Nos. 1, 2, 3, and 4) was equipped with an oven heat regulator, so as to avoid any guesswork in trying to regulate the oven temperature.

The accompanying tabulation shows the weight of each kind of food before it was cooked and the decrease of weight that occurred during cooking. All of these five different foods were cooked at the same time and according to "whole meal" instructions:

WEIGHT OF FOODS BEFORE COOKING
AND
THEIR DECREASE IN WEIGHT WHEN COOKED

	Weight of Food Before Cooking	Decrease in Weight of Food When Cooked	Per Cent Decrease in Weight of Food	
ROAST PORK				
Range No. 1	5 Lbs. 1½ Oz.	14 Oz.	17 %	
Range No. 2	5 Lbs. 1 Oz.	1 Lb. 4 Oz.	24½%	
Range No. 3	5 Lbs. ½ Oz.	10½ Oz.	13 %	Av. = 17½%
Range No. 4	5 Lbs.	11½ Oz.	14½%	
(Fireless Cooker Type)	5 Lbs. 1½ Oz.	1 Oz.	21 %	
CANDIED SWEET POTATOES				
Range No. 1	1 Lb. 7½ Oz.	4½ Oz.	19 %	
Range No. 2	1 Lb. 10 Oz.	5½ Oz.	21 %	
Range No. 3	1 Lb. 9 Oz.	3½ Oz.	14 %	Av. = 17½%
Range No. 4	1 Lb. 5 Oz.	3½ Oz.	16½%	
(Fireless Cooker Type)	1 Lb. 10 Oz.	6 Oz.	23 %	
BAKED APPLES				
Range No. 1	2 Lbs. 3 Oz.	9½ Oz.	27 %	
Range No. 2	1 Lb. 14½ Oz.	9½ Oz.	31 %	
Range No. 3	2 Lbs.	6 Oz.	19 %	Av. = 25½%
Range No. 4	1 Lb. 14 Oz.	7½ Oz.	25 %	
(Fireless Cooker Type)	1 Lb. 14½ Oz.	7 Oz.	23 %	
TOMATOES AND ONIONS				
Range No. 1	2 Lbs. 1 Oz.	1½ Oz.	4½%	
Range No. 2	2 Lbs. ½ Oz.	2 Oz.	6 %	
Range No. 3	2 Lbs. ½ Oz.	2 Oz.	6 %	Av. = 5 %
Range No. 4	1 Lb. 15½ Oz.	1 Oz.	3 %	
(Fireless Cooker Type)	2 Lbs. ½ Oz.	1 Oz.	3 %	
INDIAN PUDDING				
Range No. 1	1 Lb. 11 Oz.	3⅜ Oz.	13 %	
Range No. 2	1 Lb. 7½ Oz.	3½ Oz.	15 %	
Range No. 3	1 Lb. 8 Oz.	3 Oz.	12½%	Av. = 14 %
Range No. 4	1 Lb. 8 Oz.	3½ Oz.	14½%	
(Fireless Cooker Type)	1 Lb. 7½ Oz.	3 Oz.	13 %	

It will be observed that the largest per cent of decrease in weight was obtained with the baked apples. It should not be expected that food like apples and candied sweet potatoes could be cooked in uncovered utensils without an appreciable decrease in weight, which is mostly moisture (water).

When indian pudding and tomatoes and onions are cooked, some steam (water vapor) escapes and this accounts for the decrease in weight, even though the utensils are covered.

During the roasting of meat, grease and juices are extracted which cause the decrease in weight. The juices consist mostly of water, which has no food value. Much of the grease and juice is retained in the pan and is used for different purposes and cannot be figured as a total loss.

There are certain variations, however, that greatly affect the results when making tests of this kind. It is impossible, for example, to obtain cuts of meats which have exactly the same amount of fat and produce the same amount of grease and juices. Consequently, the amount of grease and juices that are given off by roasts of the same kind of meat will vary widely. This is clearly shown by the results of the tests.

No Way to Avoid Decrease in Weight

It is believed that no matter how a gas range is contructed there is no way to avoid a decrease in weight when such foods as roast pork, candied sweet potatoes, baked apples, etc., are properly cooked.

Because the ovens of ranges 1, 2, 3, and 4 are all of the ventilated type, the per cent of decrease in weight of these different foods are averaged in the tabulation. When one compares these averages with the per cent decrease obtained with the fireless cooker type of range, it will be seen that the decrease in weight is about the same.

This shows that these foods have about the same change of weight with the fireless cooker type of range as with the ranges having the ventilated type of oven.

The conclusion from the investigation is that most foods have the same increase or the same decrease in weight with different types of ranges.

Certain types of foods are not appetizing unless a portion of their moisture is driven off, which necessarily means a decrease in weight, and this condition holds true regardless of the type of the range. Foods of this kind are usually cooked in uncovered utensils.

There are a few foods which must be "boiled or cooked down." Of what concern is it if some foods decrease in weight owing to the water that must necessarily be evaporated, if the cooked food is appetizing?

It requires a definite amount of heat to enter into a covered pan to cook the contents properly. If the heat is evenly distributed, the type of the oven that furnishes the heat should have no bearing on the results, providing the required amount of heat is supplied at the proper rate and for the proper period of time.

The tests proved conclusively that the foods (except the meat), which were cooked in covered utensils, showed no appreciable difference in change of weight with the different types of ranges. The meat would probably have shown the same change in weight with each range, if it were possible to obtain cuts of meat that were exactly alike.

Manufacturers Should Publish Only Authentic Information

In the interest of trustworthy advertising, the manufacturers of gas ranges should hesitate to publish statements which could cause uninformed persons to believe that all foods shrink during cooking, when as a matter of fact, a number of foods increase in weight.

It is also felt that it is not proper for manufacturers of gas ranges to conduct tests in a manner which show a greater shrinkage of food with competitors' ranges, and then to advertise the results, when the difference in the decrease in weight is merely an evaporation of water. It would appear that Manufacturers who advertise claims of this kind are not presenting entirely authentic information, because the evaporated water does not have food value, and cannot be computed as a loss in terms of "dollars and cents."

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PEOPLES GAS CLUB NEWS

Published By and For the Employees of The Peoples Gas Light and Coke Company

Vol. 15 CHICAGO, FEBRUARY 15, 1927 No. 4

BATH

Hot Water —when you want it,— nothing else will do!

THE WATER HEATING CAMPAIGN is on. At this time of the year, when we are looking forward to the coming of Spring, and the shutting down of the home heating plant, the problem of heating water presents itself. And so, it becomes our problem—having the best method—and we bend every effort in supplying Chicago with Hot Water—when it is wanted—in plentiful quantities,—economically.

A Page With a "Punch."

New England Gas Association

First annual meeting in Worcester a decided success

On February 23 and 24 the gas men of New England gathered at the Bancroft Hotel, Worcester, Mass., for one of the best meetings ever held in this section. All the ingredients—excellent addresses and papers, a large and congenial attendance, and well planned diverting entertainment—requisite to producing a get-together with a "punch" were in evidence.

In addition to the New Englanders there were to be seen in the throng a number of men from New York, Pennsylvania and New Jersey.

The meeting was called to order at about ten a. m. on Wednesday, 23rd, with Mr. F. C. Freeman of Providence in the "chair." After the usual "warming-up" preliminaries, such as address by his honor, the Mayor, reading of various reports, etc., etc., the meeting got away to a good start by way of a very able address by Mr. Roy Simpson, advertising and sales manager of the Liggett Stores. His subject was "Merchandising and Advertising." In part he stressed the importance and intimate connection of the two phases of marketing goods, and the fact that several hundred gas men remained in their seats right up to the last minute attested to the interesting manner in which Mr. Simpson handled what might be ordinarily construed as a "dry" subject.

In the afternoon session on Wednesday, Mr. John A. Keane, sales manager, Hambleton & Co., delivered an address on Sales Department Personnel and Mr. E. W. Berchtold, sales engineer, Boston Consolidated Gas Company, read a paper entitled, "The Use of Process Steam in Industry." A very meaty, timely paper—we present it elsewhere in this issue in its entirety.

Much helpful discussion of Mr. Berchtold's well handled subject took place and despite the knowledge that at 6:45 the "big doings," in so far as the social side of the meeting was concerned, were to commence, a larger percentage "hung on" 'till the last word.

Entertainment Committee

An Evening of Fun and Hilarity

Promptly at quarter to seven on Wednesday evening, and to the strains of an orchestra in semi-gypsy regalia, some four hundred and fifty worthy souls filed into the hotel ballroom. Incidentally this number included fully one hundred and fifty of the fair sex. From this time onward, till a late hour, the satisfaction of the inner man, mirth, merrymaking and dancing were in order. And—others please notice—no speeches were inflicted on the diners. Office boy and president sat side by side at the various tables and, for the time, all descended or rather ascended to a level of wholesome mutual enjoyment with the aforesaid president, and office boy of course, a bandanna kerchief atop his scantily haired head, clacking rattles and other juvenile noise producers in utter abandon.

On Thursday morning Prof. J. T. Ward, of the Massachusetts Institute of Technology, presented a paper entitled "Recent Developments in the Utilization of Fuels. From time to time he stressed the very obvious fact that "the price of progress is research."

The afternoon's serious business included a paper by Mr. J. P. Leinroth, of the Public Service Electric and Gas Co., Newark, under the subject "Factors Other Than Fuel Costs Which Sell Industrial Gas" and an address, "Broader Co-operative Merchandising of Gas Appliances," by Hall M. Henry, vice-president, Gas Utilities, Inc., Columbus, Ohio.

An educational talking movie on the gas meter furnished a diverting half hour during this session.

Under a separate item in the News Section will be found a list of new officers.

Use of Process Steam in Industry*

Some practical applications of the gas-fired boiler

Edward W. Berchtold

Boston Consolidated Gas Company

THE greatest invention of man is that of creating energy by applying heat to a closed vessel partly filled with water. The liquid absorbs this heat and expands to the point of evaporation when a change of state takes place. At this change steam is formed, causing a tremendous expansion. In volume this ratio is 1,646 to 1 at 212° F and a pressure equal to that of the atmosphere.

One cubic foot of steam at atmospheric pressure weighs .03732. One pound would occupy a space of 26.795 cu. ft. It is transparent and colorless.

When partially condensed, as in contact with air, it becomes visible as a spray or mist.

To make the subject at hand a little clearer to those just entering the field of steam engineering, we will carry through the cycle of making one pound of steam. In order to do this we must have at least one pound of water.

Assuming this water is at a temperature of 50° F, we then apply the heat—this being absorbed by the water until it reaches approximately 212° F. This absorption and including that already contained above the freezing point, is called the heat of liquid.

If we continue to apply heat there will be no apparent change in temperature, but heat absorption still continues until the one pound of water has changed to one pound of steam. At the same temperature this heat is called the latent heat of evaporation and equals approximately 966 B.t.u.'s

We can now summarize our heat input and the result will give us the total heat of one pound of steam at atmospheric pressure with a temperature of 212° F.

Solution

Heat of liquid = 212° − 32 = 180
Latent Heat at 212° = 966

Total Heat = 1146 B.t.u.

If this were confined and heat further applied, its temperature would continue to rise again. The temperature, pressure, volume and heat absorbed bear certain relations to one another. These relations of continual importance in steam engineering have been the subject of much study and investigation and tabulated in various ways by numerous authors.

In order to carry on with good steam engineering we must make use of these tabulations as made in the various engineering hand books.

Boilers

The gas boilers generally used in practice are subject to the same strict construction and inspection rules as are the coal and oil-fired boilers. It is quite safe to say that a gas-fired steam boiler is less subject to rupture than the coal or oil-fired units.

The flame temperature with gas being low and the heating surface great, very little strain is put on the boiler plates. With high flame temperature and strong radiant heat such as are encountered in a boiler fired with either coal or oil, may be subject to tremendous metal strains and a great many times cause disaster.

The fire in a gas boiler can be shut off easily as it

* Read at First Annual Meeting New England Gas Association, February 23 and 24, 1927, Worcester, Mass.

is put on without any fear of creating any serious strain on the boiler plates. Therefore, we see no reason why our fuel is not far superior to any other for steam making.

Boilers may be classed as high and low pressure—the low pressure having maximum pressure of 0 to 15 lbs. gauge. Boilers carrying higher pressures are called high pressure.

A very large plant may be either low or high pressure. The size of the plant has no bearing on its need for pressure. This must be determined by the engineer making the survey. I have carried out the calculations for a few different types of work, both high and low pressure.

In order to proceed with the larger forms of steam plants the engineer must give the deepest study to each process as to the temperature required, the time it takes to do the work and the quantity of work done. These should be based on the maximum hour and calculated as boiler output per hour in B.t.u.

After having given careful study to each process in a plant and tabulated same, the engineer may calculate each process separately. They will have separate load factors which can be estimated in most cases. It is rarely that a process has a 100 per cent load factor, although it is occasionally met in practice.

Hosiery Plant

Let us take, for instance, a hosiery mill that has two dye machines of the rotary type and having a capacity equivalent to 250 gallons of water. The time required to bring the work to temperature is 30 minutes—the temperature required 212° F. The process requires 3½ hours. Unloading and refilling time one hour (operated by one man).

In addition there are eight wash vats—100 gallons each, for tempering water to 90° F, these being used intermittently. The time for filling requires 15 minutes, two adults operating, time of process one hour. These vats are fitted with ¼" pipe open ends.

There are also 24 tables of hosiery drying forms ranging from the smallest infant sizes to size six. Twenty-four of these forms are attached to each table. The operation is carried on by female help, two to each table.

Let us solve this problem and determine the boiler size required.

Let us first consider the dye process in order to accomplish the speed it can be done satisfactorily by the use of jets or open end pipes. It would be difficult to get the required amount of coil in the machine to heat the amount of liquid to 212° F in the time allotted. With a coil difficulty might be experienced in keeping it free from air due to the design of the machine. The boiler capacity may be derived at by the use of the following formula:

$$H = \frac{W \times (T - Ti) + H + 2Ri}{E}$$

Where

G = Cubic feet of gas required.
W = Weight of material to be heated.
T = Maximum temperature of material when heated.
Ti = Minimum temperature of winter feed water.
R = Radiation loss in piping.
Ri = Loss of heat through machine.
h = Time to reach maximum temperature.
H = Heat input to boiler.
E = Efficiency of boiler.

$$H = \frac{4166.6 \times (212 - 42) + 21.150 + 143.330}{.80}$$

$$H = \frac{724{,}770 = \text{Boiler Output}}{.80 = \text{Boiler Efficiency}} = 905{,}962.5 \text{ B.t.u input per hour.}$$

Then

$$G = \frac{905{,}962.5}{535} = 1694 \text{ cu. ft. of gas per hour}$$

Next we will consider the eight vats, the supply of heat being 8—¼" open end pipes. As the demand here will be four each hour it will only be necessary to figure on four jets.

These would be calculated in the same manner as the dye machines, except no holding temperature is required and the radiation of vats would be of no significance. The temperature is 90° F instead of 212° F.

$$H = \frac{4W \times (T - Ti) + R}{Ex}$$

$$H = \frac{4 \times 833.3 \times (90° - 42°) + 9{,}000}{.80}$$

$$H = \frac{169{,}810}{.80} = 212{,}262.5 \text{ B.t.u. per hour}$$

$$G = \frac{212{,}262.5}{535} = 397 \text{ cu. ft. per hour}$$

The hosiery forms will be taken up later, as it seemed advisable to use a separate boiler because the forms are in constant use and were equipped for return piping. So we will now compile our calculation as far as we have gone.

B.t.u. input required for dye work.....	905,962.5
B.t.u. input required for vats.....	212,262.5
Total input	1,118,225.0

For safety and other peaks that might be attached in the near future it is well in this case to add 10 per cent, making an input of 1,230,047 B.t.u. or approximately 2,300 cu. ft. 535 gas, giving a net output of 994,580 B.t.u.'s.

Boilers that might be used are as follows:

Bryant No. 31—S—4, giving a net available B.t.u. of 1,038,500.

Peerless No. 12—S—5, giving a net available B.t.u. of 1,020,000.

Ideal 4—G—14, giving a net available B.t.u. of 1,152,000.

The boiler should be equipped with automatic water feed and low water fuel cut off. The piping from the boiler should be of ample size to permit free travel of steam, in this case a 4" main line could be run to the dye machines and continued to the vats with 1¼" pipe. Each of the dye machines were fitted with two 2" pipes.

Each boiler should be equipped with two blow offs so that they can be properly blown down. This should be done at least once each day and on closing the plant Saturdays it would seem advisable to open both blow off cocks and empty the boiler. This will reduce the accumulation of sediment.

The hosiery pressing forms per table have a working condensing load of 21 lbs. per hour or a total load of 21 x 24 tables equivalent to 504 lbs. per hour.

To change this to B.t.u. we have, assuming the returns are entering boiler at 180° F.

212° — 180° = 32 B.t.u.'s heat from liquid
966.5 B.t.u. Latent heat
Steam 13 lbs. 246° — 212° = 34 × .5 B.t.u. specific heat of steam = 1015 B.t.u. per lb. × 504 = 511,560 B.t.u.

Allowing 10 per cent for safety and no future increase, we have 511,560 × 1.10 = 562,716 B.t.u. boiler output. The boiler giving this or the next higher net available B.t.u. rating, may be chosen from the manufacturer's catalogue.

This hosiery equipment is best operated from a separate boiler because it is necessary to maintain a constant pressure to get good results whereas if the entire load were placed on one boiler, fluctuations in steam pressure may occur due to the open end pipe in the dye machines and further the dye machines and its boiler may be closed down, allowing the pressing form boiler to continue with its operation, giving greater flexibility to the plant.

Paper Cans

In a paper can company the gas boiler has found a prominent place. In order to make cans from paper for the purpose of holding liquid, it was necessary to saturate the paper with a paraffin wax.

The paper is delivered to the manufacturer in rolls about 4' 6" long and 24" in diameter. A bar is slipped through the core of the roll and placed on the waxing machine so that it can be reeled off. The end is fed under an idler roll and over a second roll which is partly submerged in hot paraffin. When revolving, this roll distributes equally the hot paraffin over the surface of the paper. This same machine cuts the paper in widths of about six inches. These are used for the sides of the can. The tops and bottoms are cut separately and waxed in small machines which are also automatic. Following is the method used in determining a steam plant for a given load of this type:

Heat of Paraffin

Specific heat of solid, .622 B.t.u. per lb.
Latent heat of fusion, 63.18 B.t.u. per lb.
Specific heat of liquid, .712 B.t.u. per lb.
Melting point, 126° F. Weight, 53 lbs. per cu. ft.

End Waxers. Part I

Number of machines, 4. Size, 1' x 1' x ½'.
Amount of replacement wax per hour, each machine, 5 lbs.
Time, 30 minutes. Temperature desired, 315° F.

Solution

1 × 1 × .5 = .5 cu. ft. × 4 machines = 2 cu. ft. contents.
2 × 53 = 106 lbs. total weight of contents.
Heat required for solid = 106 × .622 × (126° — 40°) ..... = 5,670 B.t.u.'s
Latent Heat = 106 × 63.18..... = 6,697 B.t.u.'s
Heat required for liquid = 106 × .712 × (315° — 126°) ..... = 14,625 B.t.u.'s
Heat lost by radiation 16 sq. ft. × 400 B.t.u.'s ..... = 6,400 B.t.u.'s
Heat lost by piping 100 ft. ¾" (25 sq. ft. × 150 B.t.u.) ..... = 3,750 B.t.u.'s

Total heat per hour..... = 36,782 B.t.u.'s
As the time is 30 minutes, heat required
2 × (36,782 — 10,150) + 10,150 = 63,414 B.t.u.'s.

Replacement Wax 5 lbs. per machine per hour

5 lbs. × 4 machines = 20 lbs.
20 × .622 × (126 — 40) = 1720 B.t.u.'s.
20 × 63.18 Latent Heat = 1263.6 B.t.u.'s.
20 × .712 (135 — 126) = 3780.
Heat required for replacement wax, 6763.6.

Since the radiation on machines and piping = 10,150 B.t.u.'s the starting load is 63,414 B.t.u. and replacement or operating is 6,763.6 B.t.u.'s, the latter can be omitted due to the heavy starting load when no replacement wax is used. Therefore the heat required is 63,414 B.t.u.'s.

PART II
Roll Paper Waxing Machine

No. 1 Machine tank size, 50" × 12" × 7" ..... = 4,200 cu.in.
No. 2 Machine tank size, 45" × 12" × 6" ..... = 3,240 cu.in.
Pre Heater tanks 1 and 2, 16" × 24" × 6" ..... = 4,608 cu.in.

12,048 cu.in.

$\frac{12,048}{1,728}$ = 7 cu. ft. or 7 × 53 lb. = 371 lbs.

Then

Heat required for solid = 371 × .622 × (126° — 40°) ..... = 19,846 B.t.u.
Latent Heat = 371 × 63.18 ..... = 23,439 B.t.u.
Heat required for liquid = 371 × (315° — 126°) ..... = 49,924 B.t.u.
Heat loss through radiation of machine 54 sq. ft. × 400 ..... = 21,600 B.t.u.
Radiation loss through piping..... = 3,750 B.t.u.

Heat per hour..... = 118,559 B.t.u.

Time for starting being 30 minutes = heat required, 237,118 B.t.u.'s.

The replacement wax—25 lbs. per hour per machine.

Then going through the same procedure as above, the replacement wax heat required is 12,561 B.t.u.'s. This being a small portion of the starting load and not heated while starting, it is omitted from the calculation.

The heat requirements for these machines being 237,118 B.t.u.'s.

PART III

Consisting of 3 glue machines—capacity of water 1 cu. ft. each.

Temperature here is figured at 212° F.

Then we have

3 × 62.5 lbs. = 187.5 lbs. water
187.5 × (212° — 40°) ..... = 15,220 B.t.u.'s
Radiation loss by machines 21 sq. ft. × 200 B.t.u. ..... = 4,200 B.t.u.'s
Radiation loss by piping ..... = 1,875 B.t.u.'s

Total heat per hour ..... = 21,295 B.t.u.'s

Summary of Heat

End wax machines..... 63,414 B.t.u.'s
Roll Paper machines ..... 237,118 B.t.u.'s
Glue machines ..... 21,295 B.t.u.'s

321,827 B.t.u.'s

Therefore the boiler output = 321,827 B.t.u.'s.

$$\text{Boiler input} = \frac{\text{321,827 output}}{\text{.70 efficiency}} = 459{,}752 \text{ B.t.u.'s.}$$

We have here an unusual temperature to consider (315° F for the wax). A test on this installation with a steam pressure of 95 lbs. gauge per sq. in., temperature of which was 330° F at the boiler. The maximum wax temperature obtained was 295° F or a loss in temperature of 35°, approximately 11 per cent. For safety we will arrive at the temperature of steam to be maintained at the boiler by multiplying 315 × 1.15 which =362° F, or from the steam tables this calls for a working steam pressure of 140 lbs. per sq. in. gauge.

A very important feature about this kind of work is that the coils used in the wax tanks should be continuous and seamless, as a leak would cause considerable trouble and might injure workmen nearby by spraying hot wax.

I prefer gravity return systems wherever possible Return traps and pumps greatly increase the attention necessary for operation and also add some expense to installation and operation.

After the engineer has laid out the steam plant, he should be held responsible for its success. He should closely follow the installation to see that it is installed as planned. A plant may be planned ever so well, but if not properly installed will be a complete failure.

When the plant is ready to start, the engineer should make the test runs for acceptance by the customer. He should see that the proper gas pressure is supplied to the burner, that proper combustion is taking place. The flue temperature and analysis should also be taken.

If we are careful in planning a steam plant a very profitable business can be established for our respective company.

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GAS HEATS COLONIAL HOME BUILT IN 1754

From an open fireplace system to house heating by a modern gas fired heater seems a far cry, but down in Plymouth, Massachusetts, a twenty room house built in 1754, originally fitted only with fireplaces for heating and later equipped for coal burning, is now heated entirely by gas. This was the first house in the historic landing place of the Pilgrims to be so heated.

This house presented perhaps one of the most difficult problems for a gas engineer to solve, particularly on account of its age, in spite of the fact that it must have been substantially built to have existed for nearly 175 years. This house is located in such an exposed position that some heating has been necessary even during the summer months. The total gas burned during 12 months was more than a million and a quarter cubic feet. The owner estimates, taking into consideration all of the collateral costs of heating by coal, that the cost of heating by gas is approximately the same and the results much more satisfactory, as it has required no care whatever except weekly winding of the thermostatic control.

When this house was built it was one of the most modern in town and it now has the most modern type of heating.

Another resident of Plymouth, who owns a large summer house which is sometimes used throughout the winter, has solved the house heating problem by installing a gas fired heating system with thermostatic control. During the days in winter when the house is not occupied the thermostat maintains an average temperature of 40 degrees which can be easily raised to 70 degrees when the house is occupied. The only attention which this system requires is an occasional visit of the caretaker to see that everything about the house is in good order.

Business Shows Improvement

Regional growth of economic production causes shift in economic gravity centre

Walter Alwyn-Schmidt

BUSINESS is getting better. The depression which has characterized the first weeks of the present year has apparently worn off and has made place for a more hopeful state of mind. This can not have been any surprise to those more intimately conversant with the condition of the national business, as it was obvious from the beginning that the recent depression was not so much economic in origin but a state of mind caused by an undue distrust against the carrying power of the market. That the stock exchange has suffered from an attack of "nerves" is only natural under such conditions. The recent bear raid, therefore, can not be charged to any inherent weakness in the nation's economic structure. This, in fact, is just as strong as it has been all through last year.

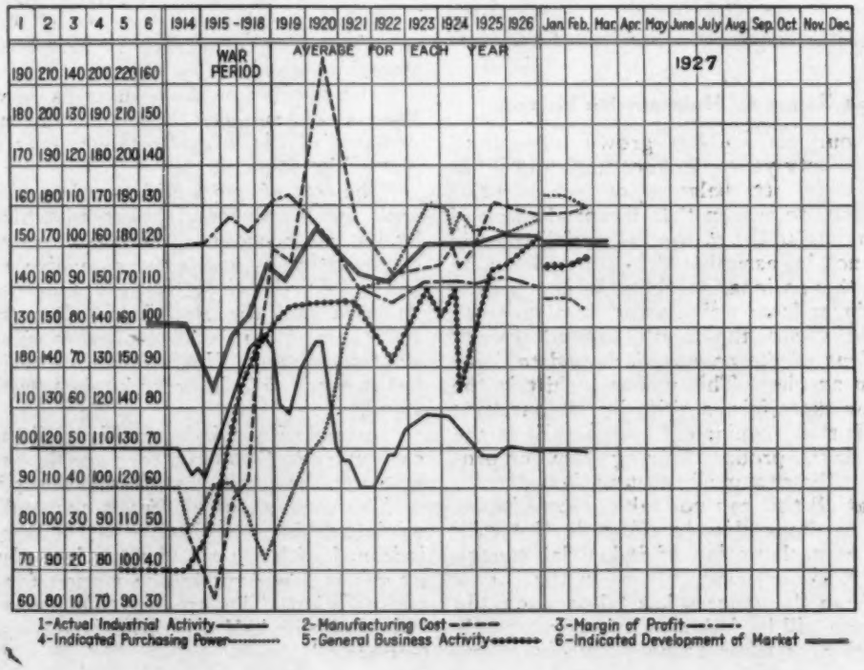
What, then, are the causes of these recurring deflections from the otherwise unobstructed path of prosperity?

Effect of Foreign Relations

One no doubt is political in origin. The country rightly or wrongly received a severe shock by the sudden tension in our foreign relations, especially with Mexico and Nicaragua, with the Chinese troubles thrown in for good measure. The American business man is so convinced of the isolation of the American market from the rest of the world that he is easily upset by discovering any evidence to the contrary. Having been convinced, however, by the prompt action of the state department that there was no change to be expected in the general attitude of government to the various problems of our foreign relations, business soon settled down again to a more tranquil state.

Nevertheless there remains as an undercurrent in the conduct of our daily business the growing conviction that the United States can not free themselves any more from contact with foreign markets, and that the well being of these markets must have its effect upon the growth or decline of our own business curve.

But while "nerves" no doubt have been principally responsible for this reaction of the foreign news upon business, there is more definite reason for the present uncertainty of the outlook provided by the shifting gravity of economic activity in our own market. With the exception of Russia there is no other market of the same size and the same diversification in climate and natural resources than the American. But while the Russian need of bringing into harmonious swing the whole of this market is deferred to a future period it has become very urgent, indeed, in our own country. It forms in fact one of the principal problems confronting today the American statesman, economist and business man, and incidentally also one of the main disturbing factors of our economic life.



Division of Country Along Economic Lines

Speaking in very general terms the American market was generally looked upon as being divided in two large sections, roughly indicated as the East and the West; the South so far having been regarded as a minor appendage, always economically speaking. Under this scheme of division the West was supposed to buy all that the East was manufacturing, while the East had to absorb the food production of the West. Our whole transportation system, our manufacturing organization, our agricultural life, had been built up on the assumption that this division was correct.

Now this all has changed. The country breaks up in a number of smaller sections, each with problems of its own and each providing economic and political backing in support of an immediate solution of these problems. The West, the South, the North West, the Far East, the East, the Middle West, all are coming forward; not only to present their case but unfortunately also ready to fight for it as evidenced by the formation of still indistinct but nevertheless fairly sharp circumscribed political groups, each with a strong representation at headquarters.

Business men thinking in terms of national distribution find suddenly that they have to readjust their previous conception of the market. Active and very energetic competition arises where formerly it had not existed and calls for new and not yet tried methods of combat. The South, no doubt, is an excellent example of this condition, becoming a very strong industrial producer and running, while doing so, straight against the sentiments and preconceived ideas of complete geographical units of the Eastern market. Instead of having to worry, as in the past, about foreign competition, these Eastern manufacturers now suddenly see themselves faced by a Southern, Western, or Northwestern competition against which there is no panacea in the form of "protection."

Market Has Failed to Maintain Its Balance

Numerically our market has grown, of course, during the last twenty years. But economically it has failed to maintain its balance of consumptive capacity. It stands to reason that the production of one thousand hands added to the industrial army in the south can not be assimilated in its entirety by the growth of the national market. It must withdraw some business from a similar productive entity in another place. Hence this new industrial activity in certain sections of the country is bound to force a slowing up in another. This means a shift in the direction of raw materials, a shift in the purchase strength for industrial equipment, and a shift in the direction of industrial produce flowing from the production center to the center of consumption.

It is clear that all this can not take place without some hardship to those directly affected. Not only must there be transplantation of industrial energy and gravity of transportation, but, as in the past a cityward flow from the country has taken place, the present movement will be followed by a corresponding transplantation of labor to new sources of income. It is the growing realization of this process that is the principal explanation of the present nervous state of the market.

Novelty of the Situation to Blame

Industrial producers, wholesale distributors of merchandise, and retailers view with undisguised alarm this development because they have not yet learned how to deal with this situation. It does not help either of the three to be told by statistical experts that it does not matter really where our national industrial production originates or where it is sold, as long as there is no loss of the grand total because they know only too well that the shoe pinches. No doubt, it is the novelty of the situation which must be blamed for the present ill and, like in all such cases, the ill itself is bound to produce its own remedy. A few years may pass still before the market has adjusted itself to its new requirements. During this period trouble may have to be guarded against. But the elastic American methods of doing business are suited eminently for dealing with a condition exactly like that which we are facing today. So there is no reason for disquietude. The market apparently has found this out already. Hence the generally more optimistic outlook taken by all those competent to judge.

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GERMAN AUTHORITY PRAISES AMERICAN HOME USE OF GAS

Lavish use of hot water for bathing and washing, and the demand by American women for gas fired water heaters and stoves has developed in the United States a per capita consumption of manufactured gas at least double that of Germany, according to Herr Ludwig, eminent gas engineer of Munich, in a report upon a recent visit to this country to study American gas utilities.

"The position of the woman has a very potent influence on American conditions, and in America they demand all the latest improvements for use in the home," he says.

"The cost of gas is of lesser importance compared with the convenience and speed which are attained by its use in cooking. Another reason for the high consumption of gas is the extensive and free use of hot water. Hygiene is very much emphasized in America and the American takes frequent baths. Each home has at least one bathroom and often there are two or more. Hot, not merely warm water is on tap at every sink, in every kitchen and in every wash stand.

"Instead of carefully washing off the dishes, as is customary in Germany, they are flushed off with hot water so they will dry without being wiped.

"The washing of clothes is accomplished in automatic washing machines heated with gas. The wash is ironed with the aid of a gas iron. In this free use of gas is found again the reason for the high gas consumption. The use for this purpose is at least two and one-half to three times as great as in Germany."

As The Journal Views It

IS OPPORTUNITY KNOCKING?

At the recent meeting of the New England Gas Association, Professor J. T. Ward, of the Massachusetts Institute of Technology, stated in no uncertain manner that we must pay for progress with research. Further, although he did not refer pointedly to the following aspect of research, one might have deduced from his remarks that research is not concerned with mysterious and abstruse matters, as is generally thought, but rather works toward a most practical end. It is by no means a far-fetched statement to say that there is probably no research work being undertaken anywhere at the present time whose ultimate consummation will not have a practical application in the world's progress, industrial and otherwise.

The handicap that research has to overcome is that many executives—and we include the successful "breed"—are wont to look upon this type of investigation as the diversion of a lot of comically-clad, bespeckled pedagogues and theorists. They are merely dreadfully misinformed.

Many industries depending largely on engineering practice have gotten the jump, so to speak, on our gas industry, mainly for the very apparent reason that they have been more alert in applying research to the working out of their problems. Consider, if you will, the matter of automatic refrigeration for the home. The physical laws involved in this matter, we daresay, were well known to gas engineers long before the advent of electricity as an active, going business. And yet electric refrigeration for the home has been on the market for a number of years and thousands of units now grace the kitchens and pantries of American residences. But "the race is not to the swift."

Impartial authorities have agreed that gas refrigeration possesses not a few advantages over electric refrigeration and it is patent that we shall witness, from now on, the installation of many gas fired units in homes and various institutions. But, are we going to sit back at this juncture and indulge in a deal of self adulation? Are we sufficiently far-seeing and game enough to invest a relatively few dollars by way of research in this our newest application of gas? Will not a trifle more of vision enable us to dominate the situation in so far as "house-cooling" is concerned? And, make no mistake, we are fast approaching the stage where homes will be cooled in the humid days of summer by means of some mechanical or power impelled apparatus.

Are any of our engineers prepared to state how much cooling can be accomplished in the average home for the sum of five dollars per month? Or if this amount would furnish an insignificant quantity of cooling, what sum would take care of the situation? If this latter figure were not found to be prohibitive how large would the field be; and how would the unit be planned? Would it be a combination unit bringing in the dual function of cooling the home and preserving food?

Is the problem worth tackling or shall we wait till some other agency blazes the trail? In short is opportunity beating a vigorous tattoo on our front door?

HOME BUILDING AND APPLIANCE SALES

The fore part of the present year it was stated that the construction of large structures, such as hotels and other public buildings, was perhaps being overdone and that we might soon arrive at the point where there would be a feast of available space but a famine of those able to occupy the same.

The International Cement Corporation recently undertook a survey on the outlook in the building industry and in part their findings brought out the following point:

"Latest United States census figures show an average yearly increase in population of 1,437,480."

This latter figure is, of course, interesting to gas merchandising men because it roughly represents 300,000 new families in the market for gas consuming appliances. A very tempting morsel indeed!

But over and above this figure we must also reckon with replacements which should certainly hearten the more timid. Then too we must bear in mind that we have not as yet approached the saturation point in the distribution of appliances.

Of a verity we are doing a lot of building in this country but timorous and lazy inclined persons should not use this as an excuse to explain away lack of sales. The field is a fertile one but even so we must apply energetic merchandising and sales methods in order to get our share of the business.

Search and Research

Necessity of research in gas industry

J. E. Bullard

THE gas industry has progressed to its present status largely because it is a basic industry. It is producing something that under modern methods of living is a necessity. Most of the competition it is called upon to meet has been the result of research in other industries.

It has failed to accomplish all that could be accomplished because there has been too great a tendency to follow tradition rather than research. A gas man is likely to speak with pride of the fact that the gas meter in use today is very much like the very first gas meter invented. He is not looking with longing and desire for a gas meter that will measure heat units rather than cubic feet and make it possible to sell the gas that can be produced at the lowest cost rather than a gas that comes up to the thermal standard set by the law of the state in which he is selling gas.

Though there are no longer many communities that are without electric service, there are a surprisingly large number of communities of fair size that are without gas service.

The difference here is the difference in the importance that has been placed upon research in the two industries. The electric industry was among the first to establish research laboratories. The large manufacturers have their laboratories, and there are a number of private laboratories among the most famous being that of Thomas A. Edison. Nearly every educational institution doing research work of any kind is doing some work in the electrical field.

Problems Electrical Research Has Solved

It was in these research laboratories that the problems of high tension transmission and the other problems, the solution of which has made it possible to serve small communities with electricity, were solved. It was out of these laboratories that came such things as the modern highly efficient electric lamp which has virtually driven gas from the lighting field, the radio tubes which in their further development promise greatly to decrease the cost of transmitting electricity, and innumerable other things that have broadened the electrical field, increased efficiency and reduced the cost of electric service to the consumers as well as placing the service within the reach of more people.

One reason why there has been such slow progress in the distribution of gas has been that there has not been sufficient research work done. Unless real research work is undertaken on a worthwhile scale the gas industry can look forward to having more and more of its fields invaded and be forced to develop more and more new ones. It is obvious the time will come when there will not be enough new fields left to develop.

At the present time gas stands supreme in the heating field. On account of the great waste from the coal pile to the switch board in turning coal into mechanical power, electric heating is not economical except in those cases where electric energy makes it possible to apply the heat with so much less waste than is possible with heat in any other form that the initial heat waste in generating the current is more than offset. However, it is well to bear in mind that each year millions are being spent in electrical research work.

During the past quarter of a century steam generation of power in electric power plants has undergone a marvelous change. Before another quarter century passes it may happen that the research workers will find a way to generate current from atomic action, and to generate it at an extremely high efficiency. Therefore, it is unwise to feel too secure in the heating field. There are too many brilliant minds searching for new things, new methods, new discoveries in the electric field to warrant any feeling of security, to warrant taking for granted that for any great length of time eighty per cent of the heat value in the coal will be wasted in transforming that heat into electrical energy.

Oil Industry Doing Research

But the electrical field is not the only field to worry about. The oil industry is also doing a great deal of research work. It is folly to take it for granted that the oil resources of the country will soon be exhausted and there is no need to worry about oil competition. Work is already being done with a view of making it practical and economical to transform coal into a liquid fuel. Experiments are being conducted with various forms of vegetation. As long as there is a demand for a liquid fuel and research continues there will be a liquid fuel available. It is possible that at any time research will show how to produce a liquid fuel that is superior to petroleum products and that can be produced and distributed for less than the present cost of oil. Research as well as search for new oil fields is constantly going on and there is no telling when this will revolutionize present methods and conditions.

There is no question about the use of solid fuel being on the decline. When it is being used it is coming more and more to be the practice to pulverize it so finely that it can be utilized in much the same manner that a gaseous fuel is used. This very getting away from solid fuel is leading to search and research in other fields. It means that new fuels are going to be discovered or produced, that new methods of utilizing fuels will be found. The industry

(Continued on page 244)

INDUSTRIAL GAS LESSONS

IF IT'S DONE WITH HEAT — YOU CAN DO IT BETTER WITH GAS

Lesson No. 159

Oil Gas

Operation of Oil Gas Process

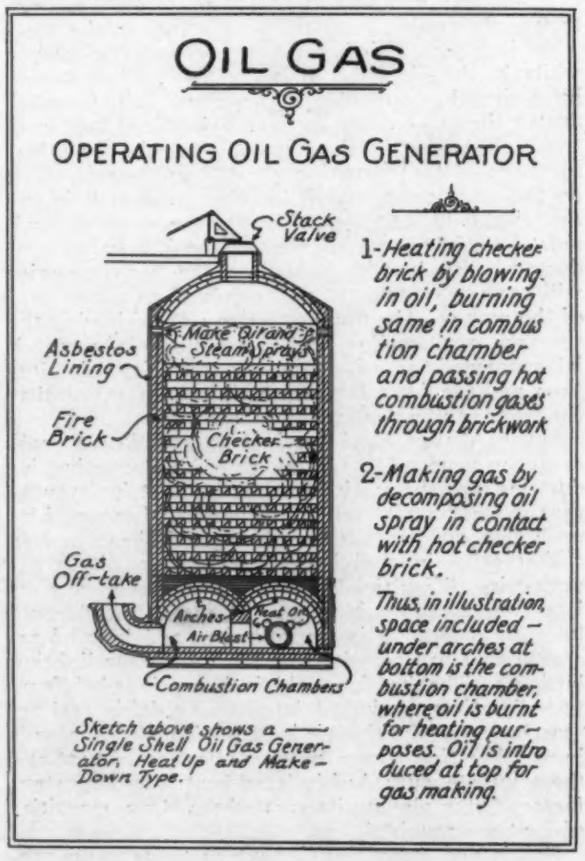
The apparatus which is used in the manufacture of oil gas, or as it is also called Pacific Coast Oil Gas, has been described in the previous lessons. It has been shown that there are three different apparatus and processes for making this gas. First there is the single shell generator operated by the heat up and make down method, and then the same generator operated by the heat and make down method, and finally the compound or two shell generator of the Jones process proper. As has been stated before, the Jones process consists in making oil gas by gasification of oil mixed with steam in a chamber which is full of heated checkerbrick. This brickwork is heated by the combustion of oil and when it attains the proper temperature, the heating is stopped and gasification commences. The process is thus a discontinuous one just like the manufacture of carburetted water gas, and consists of gas-making and heating periods which alternate.

Heating Period

When a new generator is set into operation the heating period simply consists in burning oil in the combustion chamber and passing the hot combustion gases through the checkerwork which is heated up to the right temperature for oil gas making. However, after the generator has been used, an accumulation of carbon ensues and the bricks are covered with a fine deposit of carbon. It is therefore necessary, not only advisable, to burn this carbon off and this is done by blowing through the generator a current of air which oxidizes the carbon to carbon dioxide. The heat that is generated during this process helps to raise the temperature of the brickwork and thus makes it unnecessary to use as much oil fuel in the heating period proper as would otherwise be necessary.

The air-blowing period is of short duration only and is immediately followed by heating with a stream of oil. The oil is atomized with steam and is thus blown into the apparatus in the form of a fine spray. The hot combustion gases then heat the brickwork up to a temperature of 1600 to 1800 degrees F. The oil that is used for the heating of the generator contains carbon, hydrogen, sulphur and a small amount of nitrogen and oxygen. The carbon is of course burnt to carbon dioxide as completely as possible, the hydrogen burns to water vapor, both reactions liberating considerable quantities of heat. The sulphur will burn to sulphur dioxide and the nitrogen is set free as such. The amount of air added should be only in slight excess of that required for complete combustion of the fuel.

As far as the make-period is concerned, it is just necessary to mention here that the manufacture of oil gas is accomplished by a series of reactions which result in the decomposition of the heavy hydrocarbons in the gas with their conversion into more volatile, lower boiling hydrocarbons, and also by those reactions which involve the action of steam on the incandescent carbon in the generator and hydrocarbons in the gas. The chemical character of these reactions we shall leave for later lessons after the general principles of chemistry and chemical reactions have been described.


OIL GAS
OPERATING OIL GAS GENERATOR
Stack Valve
Make Blast & Steam Spray
Asbestos Lining
Fire Brick
Checker Brick
Gas Off-take
Arches
Heat Oil
Air Blast
Combustion Chambers
1-Heating checker brick by blowing in oil, burning same in combustion chamber and passing hot combustion gases through brickwork
2-Making gas by decomposing oil spray in contact with hot checker brick.
Thus, in illustration, space included — under arches at bottom is the combustion chamber, where oil is burnt for heating purposes. Oil is introduced at top for gas making.
Sketch above shows a — Single Shell Oil Gas Generator, Heat Up and Make-Down Type.

SEARCH AND RESEARCH

(Continued from page 242)

that goes ahead most strenuously with its research work is the one that is most certain to win out in the end.

Since the days of Murdock there have been no very radical changes in the production of gas. Some oil gas and some water gas has been produced but the bulk of gas still comes from the distillation of coal, in ovens or retorts that do not depart radically from those used by Murdock as far as principle is concerned. But compare the steam units in a modern power plant with those of twenty-five years ago. Here a tremendous change has taken place. It is a change that has been the result of research. Had there been no research there could not have been so great a change for the first steam turbines were far from the reliable efficient machines in operation now. Then look at the boiler rooms. The piles of coal and the shoveling men are all gone. Everything is done automatically. Of course this change has also taken place in gas plants, but the daring of the electric man is revealed when we enter the boiler room where 1200 pounds of steam pressure is used in the boilers. Research makes the difference.

Gas Companies Hold Control

In the gas industry there are no large manufacturing plants that compare with plants in the electrical industry. This is the case very largely because while in the electrical industry the manufacturers have virtually controlled the industry, in the gas industry the gas companies have gained and held control. Therefore, in the gas industry the manufacturers are not in a position to carry on research work on the same scale that it is being conducted in the electrical field. In the gas industry the research work must be conducted after the fashion it is being conducted in the laundry industry. The gas companies will have to co-operate and supply the greater part of the money. The most effective way of having the research work conducted is to establish real research laboratories in some of our best educational institutions and provide a large enough endowment so that the work can be done without handicaps.

Unless real research work is done and on a scale commensurate to that being done by competing industries then the gas industry can take it for granted that it will have to relinquish more and more of its profitable business. Today because it has been so conservative in applying scientific rates, it is experiencing difficulties that it need not experience. It is giving away business that it just as well could keep for itself. It is conservatism and lack of research that has permitted the losing of the lighting business. The heating field is being invaded from two directions by industries that are doing real research work. The electric industry is making inroads in one direction where direct application of heat and the complete control of isolated heat is an important factor. Oil is playing its part where large quantities of heat are required.

Gas is not something for which there is no substitute as is water. It is quite conceivable in spite of the apparent impossibility at present that in years to come a person may take his choice between three sources of heat. He may take it from wires that bring electric energy into his home. He may take it from pipes that bring some form of liquid fuel into his home and for which apparatus has been perfected to give perfect results at low cost, or he may take it from the gas pipes.

It is safe to say that there are more men engaged in perfecting oil burners for domestic heating plants than there are engaged in perfecting gas heating apparatus. Oil burners are constantly being improved. Any improvement in gas heating will have to come in the distribution and gas making system. Oil burners will eventually not only be perfected but there is every reason to believe that oil heating will be made much more economical than it is at the present time. This will come about through better burners and cheaper fuel. When oil from oil wells becomes too expensive we will get our liquid fuel from some other source. Research will attend to that.

Research and Tradition

The real competition the gas industry has is that between research and tradition. The gas industry has followed tradition rather closely. Its competing industries have turned toward research and are willing to scrap all tradition. The best example of the difference between the progress made by research and that made by tradition is the United States compared with China. It may take a quarter of a century, it may take a half century for research to win over tradition, but it took the electrical industry but forty years to get the bulk of the lighting business. It is already much farther advanced in the heating field than it was in the lighting field forty years ago. Here also the liquid fuel industry is making itself felt.

If the gas industry continues to follow tradition there is no question about the future it will enjoy. This does not mean it will go out of existence. Perhaps it will not cease to grow. It does mean that it will be forced to take what neither the electric nor the liquid fuel industries care to bother with. China still exists and is able to have its revolutions even though it has been sliced up by the greater powers.

Though the right kind of research work means the spending of probably not less than a million dollars a year, it also means tremendous returns. It is research that has made the electric industry forge ahead, it is research that has made the automobile industry grow at such a marvelous rate, it is research that has developed the oil industry. It is research that makes any industry grow and prosper. The laundry industry has gone ahead at a surprising rate since it began spending money for research work. Millions in research work result in billions of business in new fields that never would be exploited, or could not be, were it not for the research work done. That industry in a competitive field which does not do real research work these days is going to find it increasingly difficult to maintain its business volume and to show a profit.

HELPING HOME MANAGERS

There are many, many ways to maintain and increase domestic load but as we view it the most important is via home service work. If the gas man will advertise home service helps consistently and lend his ideas in other directions to the work of building up the home service department he will be nicely compensated through an increased demand for more and better home labor saving appliances. The campaigns are little more than aggressive drives to bring people into the store to buy and home service work is just another means to that end plus the added attraction of seeing and learning how the appliance is put into actual practical use.

Cake Decorating
HAVE you not often admired a beautifully iced and decorated cake and wished you knew how the effect was attained—or wanted to try it yourself at home with some original design?
The FREE Cooking Class
at 7:15 Monday Evening
in the Home Service Auditorium
will be devoted to "Cake Decorating." An art it is, yet simple when you know just how it is done. Miss Helen Wethrell, Manager of our Home Service Department, will tell you all about the decorating of cakes and give you designs and recipes if you like.
Every cake must have its "dressing," especially the party cake—layer upon layer of 'dainty goodness, with twirls of icing, rosebuds or floral designs about it. If you are planning a Valentine, Washington's Birthday, or any other party, you will not want to miss this class.
FREE COOKING CLASSES are held at 2 p.m. every weekday except Saturday. The Evening Class Mondays at 7:15. Everything is Free.
Home Service Auditorium
The LACLEDE Gas Light Company
Olive at Eleventh
CEntral 3800

ILLINOIS GAS SERVICE
Phone
Bridge
1041
DAISY MAID
The little Gas aid
Home Service—
When you buy a new Gas Range, buy one with an oven-heat regulator. If you buy it from us we will send a demonstrator to your home to instruct you in its operation—if you buy it elsewhere, phone our Home Service Department, if you need help. The service we render is FREE, and obligates you in no way—it's a phase of Better Public Service.
Illinois Power and Light Corporation
YOUR GAS CO.
414 MISSOURI AVENUE

Laclede Gas Light Co., St. Louis, and the Illinois Power and Light Corporation, whose advertisements are shown on this page, are attacking this problem of enlisting the home manager's attention in ways that are likely to be attractive. It will be noted that both companies offer certain services to the home manager FREE and that in both instances nothing is being sold. It is assumed that the big idea back of both of these advertisements is that if the home service department is able to secure the friendship of the home manager that more and better gas appliances will be used, and that the gas company will sell its share of these appliances.

After all is said and done regarding intensive sales

☼ ☼ ☼ ☼

ABSOLUTELY RIGHT

This writer heard Mrs. Peterson, of The Peoples Gas Light and Coke Co., tell a group of home managers that she thought that all gas ranges made today should be equipped with oven heat regulators. We quite agree with her, just as long as ranges are placed on the market without oven heat regulators folks will buy them and just so long as they buy them will we be confronted with the problem of educating them to the value of modern self action gas appliances for any and all purposes. Has any gas company discontinued the sale of ranges without oven heat regulators?

Behind the Scenes in Home Service

Anna J. Peterson

Director Home Service Department, The Peoples G as Light & Coke Co.

"YOU are very welcome. I am sure you will have success with that recipe," I conclude, hanging up the receiver, and turning to my secretary, May Flannigan Smert, who sits by my side with a handful of letters.

"What would you tell this woman who wants to know how to wash windows in freezing weather?" asks my secretary with pencial ready, "and what shall she feed the three year old who has no appetite?"

"Just this," and I explain until the phone rings again.

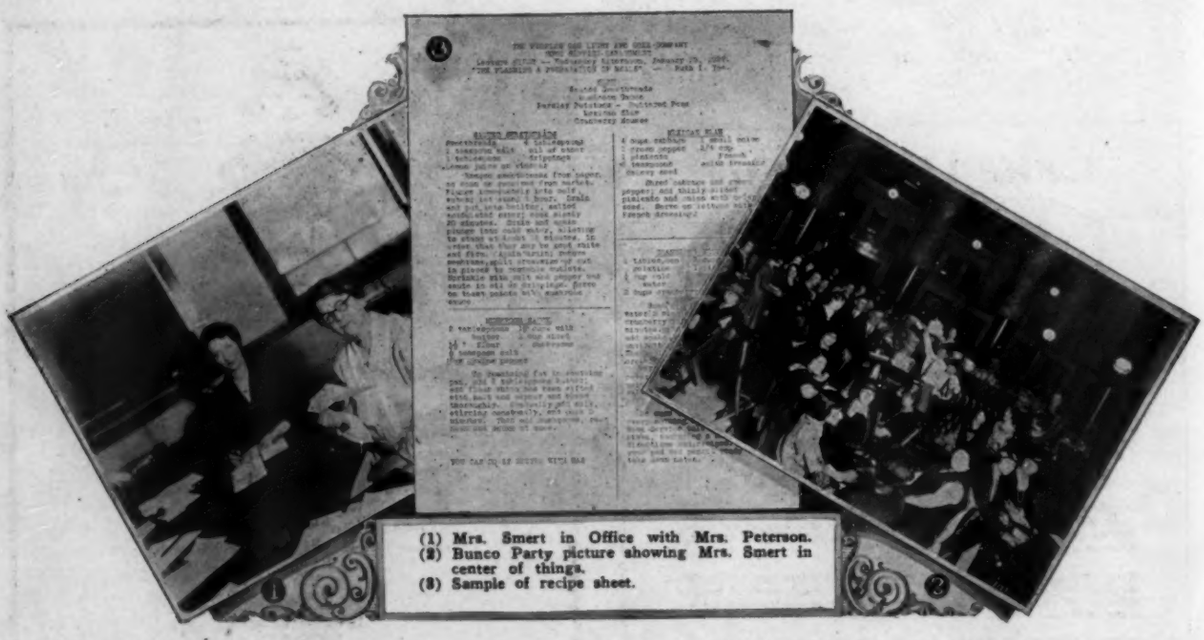
And so we continue fitting the letter and dictation into the minutes between phone calls and quick queries from others of the staff, coming into the office, until the mail is answered.

"On these three outside lectures for today, the assignments have been made and I have ordered the supplies for the demonstrations and checked the account," concludes this trusty secretary of mine as she clips her papers together. "Here are the special appointments you have for this morning and afternoon."

The day is well started. As she leaves for her office on the third floor, away from the auditorium and offices open to the public, I look after her thinking, "A Home Service Director may have the desire to do many things for her company, but if she did not have a competent secretary, punctual and to the nth degree ethical in that line of work she would be somewhat like a buoy at sea which has lost its mooring. No matter how competent, or how well versed a director may be in the business of the department, without her secretary and staff of coworkers she would be rather a helpless creature."

Letters and Files

The radio has brought us not only many attendants at our demonstrations, but also quantities of letters. Maybe some particular lesson has been mentioned and the recipes not included in that day's table talk. All the women who especially want those recipes, write us for them, often asking questions about cooking or household problems.



(1) Mrs. Smert in Office with Mrs. Peterson.
(2) Bunco Party picture showing Mrs. Smert in center of things.
(3) Sample of recipe sheet.

Our home service articles published weekly not only in one of the large daily papers, but also in a number of local papers, circulating in the community of our neighborhood services, bring a large number of inquiries for special lesson sheets.

When we offer booklets or recipe sheets through the medium of our Gas Gazette, enclosed with the gas bill, or contribute articles to trade journals, invariably our mail is increased greatly.

All of these letters, in addition to the regular business letters which come to my department, are cared for by my secretary and her assistants. The mail and mass of detail have grown so that she needs the full time assistance of a typist and a clerk, in addition to the frequent use of the dictaphone service.

For instance in one month recently we received and answered over three thousand letters in addition to the mail sent out in response to phone calls. We count our phone calls the S. O. S. department of our service, and the majority of customers calling have the recipes given to them immediately. But when

special lesson sheets have been announced over the radio or through the newspapers, many women phone rather than write for the material to be sent out to them.

To care for the mail promptly, answer all questions correctly and courteously, is a vital point in any service. It is invaluable assurance, for a busy director to know that her hastily dictated letters will go out with the sentences smoothed and grammatical, and that the spirit of courteous helpfulness will pervade the letter, so that the woman receiving it will come again whenever she needs help.

Our recipe files have grown to such proportions that a complete card index system is needed at all phone desks. The careful preparation of this index means quick phone service and satisfaction for the customer. Back recipe files, kept up-to-date, files for all special material, letters and publicity involve a great amount of work and must be carefully fitted into office detail to make business run smoothly. It means the secretary can answer to all questions, "Yes, I have it right here."

Source of Information

In the secretary's office is an extra desk with a row of cook books, and a pile of current magazines, and a comfortable chair.

Girls from the staff downstairs come to this haven to work out special material, prepare radio talks, and write special lesson sheets. Information is at the finger tips here, from clippings, magazines, books, and our own files, to refresh the memory.

Fitting Details

When you see the big flywheel of the machine spinning rapidly, functioning smoothly and doing its work, you know very well that the small inner wheels and cogs are transmitting the power which makes that possible.

To me, that is just what the secretary of a director does for her in handling the detail which is vital to a live, active department.

For example, when I outline the recipe sheets giving the exact ingredients and telling how to combine them, I know that my secretary will fit the recipe to the sheet without omitting a single important point of instruction. She will check the list of ingredients carefully, and understandingly, turning out a reliable piece of copy.

In other words, a home service secretary must be more than a good businesswoman trained in office routine. It is vital that she know about foods and cooking so that she handles the work intelligently. This is a necessary asset too for the co-workers in her office.

When the recipe sheets are typed, she must see that the proper number are mimeographed and distributed to the outlying services, to the main floor booths, to our main office files, and to the demonstration classes.

She checks the supply list, and orders all staples, assuring quality and quantity of such supplies with no waste. More than that she distributes and accounts for all cash expenditures in the department.

All outside appointments for clubs, schools and church guilds are made with her. Speakers are assigned, and sent out on the specified days, and a record made of the number of people present at each lecture-demonstration.

Through her, all records of the department are available. She knows day by day, month by month, just how many phone calls have been received, how many letters, how many people attended the daily demonstrations in all of the services, and how many have been present at the outside talks.

Special Stunts

Last year, we featured a cake guessing contest, which brought an amazingly large response.

In our experiment kitchen we worked out a recipe for a very delicious cake which I had eaten on a western trip. It was a three layer cake with unusual filling. We advertised the recipe, displayed the cake in our windows, made it in our classes, and had all the women baking it for their families, so that they might suggest a prize winning name for this cake. We offered three worthwhile prizes.

It was my secretary's part to provide, distribute, collect and tabulate the form guessing cards. Over 15,000 guesses came in, and were expeditiously cared for in her office, sifting them for the final work of the judges.

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COOKING CLASSES FOR SMALL COMPANIES

The Illinois Power and Light Corporation at Granite City and Madison, Illinois, has worked out a plan whereby they are to conduct a series of week-end demonstrations for a period of six weeks to the Campfire Girls of those cities. Miss R. Lee Vande Sante, director of the company's home service department is an ardent advocate of mass demonstration and especially is she interested in demonstrations conducted for the future home manager. It seems to us that if a consistent effort of this kind was employed generally throughout the smaller cities that the job of selling would be greatly acceler-

ated. In East St. Louis the company's demonstrator, Mrs. A. Combs, has worked out a plan whereby demonstrations are held before parent teachers associations. These demonstrations are held in the schools at the invitation of the president of the associations and in co-operation wherever possible with the domestic science teacher. Nothing is said regarding any make of appliance, nor is any inference made regarding the purchase of any make of appliance. The company feels that if it is successful in getting people to do more home cooking that an increase in sales will naturally follow.

PROGRESS IN GAS TECHNOLOGY
Domestic and Foreign

FUSIBILITY OF COAL ASH AND CLINKER FORMATION

AN attempt has been made to find some property of coal that can be measured with a fair degree of accuracy and that will serve as an index of its clinkering character. A detailed description of the entire problem is contained in Bulletin No. 29 issued by the Carnegie Institute of Technology. The discussion starts with a study of the concentration of ash globules and the formation of clinker. The relation between the ash fusion temperature and the clinker trouble is summarized as follows: First, given coal from the same bed, the clinker trouble usually increases as the fusion temperature decreases. Second, on coals from the same bed, clinker trouble usually increases with an increase in the ash content. Thirdly, in coals from different beds, the relation between ash-fusion temperatures and clinker trouble may vary through fairly wide limits.

A section of this Bulletin is concerned with the laboratory study of the nature, distribution, and fusibility of the ash of seven coals. These coals were of the semi-bituminous and bituminous types. The coals were analyzed in the usual manner and the fusibility of the ash was determined by three different methods. First, the standard gas furnace test was applied, then the Sinnatt method, and third the micropyrometer method.

The three methods and the apparatus are described in considerable detail in the Bulletin. The results obtained by the three different methods are given and compared.

Float and Sink Tests

The float and sink tests were made with coals, after they had been crushed to pass a twenty mesh screen in solution of benzol and carbon tetrachloride of 1.35 specific gravity. Good check results were obtained in determining ash fusibility with cones as used in the standard gas furnace method and with ash rods as used in the Sinnatt method. Some difficulty was experienced in observing the initial fusion and the fluid temperature with ash rods. In general fusibility results obtained with the micropyrometer method did not check well with those of the other two methods.

Analsis of portions of the clinker formed in the burning tests showing that the composition of the clinkers resembled that of the ashes of the sink portions more closely than that of the ashes of the float portions.

Ash Bed Refuse

The Bulletin also contains a report which was made on a study of ash bed refuse which is produced by burning coal. Practical methods for burning coal are discussed, and the factors that affect the formation of residue are outlined to be, first, the chemical composition and distribution of the inorganic matter in the coal; second, the amount of inorganic matter and the percentage of intrinsic and extraneous portions; third, the size of the coal fired; fourth, the disintegration of the coal in burning; fifth, the temperatures to which the ash is subjected at various stages of the burning; sixth, the character of the atmosphere surrounding the ash while in the furnace; seventh, the agitation and movement of the fuel during or subsequent to burning.

Detailed tables are given showing clinker characteristics from various coals. Measures of troublesomeness of clinker are given and are indicated to be total weight of residue to be handled, size of pieces formed, strength of large pieces, draft-blanketing nature of fuel bed residue, flow of fused residues over grate bars, burning of metallic parts of the grate and lowering of boiler output.

The third section of this Bulletin deals with coordination of clinker formation obtained by burning coals with the fusion and chemical analysis of the coal ashes. While certain conclusions are given, it is stated that more experimental data will have to be available before these conclusions can be considered as absolutely definite.

First, the average quantity of clinker formation relative to the total ash in the coal and also the size of the clinker pieces seems to have a fairly definite relation to the softening temperature of the coal ash as determined by the standard furnace method.

Second, this relation is better expressed by using the softening temperature than it is by that of the initial or fluid temperature.

Third, no better relation can be obtained from the softening temperatures of the ash of the float and sink portions of the coal separated by fine grinding and using a liquid of 1.35 specific gravity.

Fourth, the clinker formation does not increase materially until the softening temperature of the coal as is below 2600 degrees F.

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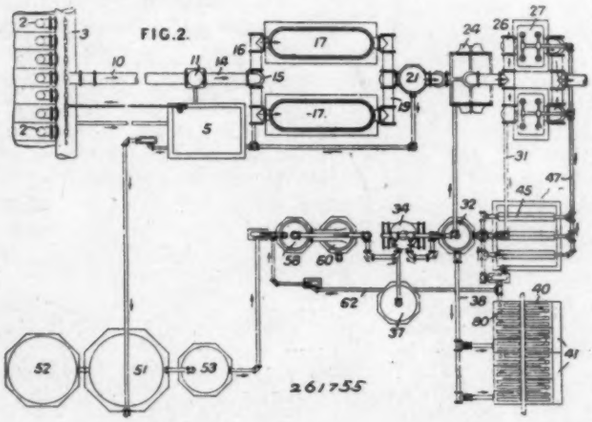
PURIFYING GAS

SULPHURETTED hydrogen is removed from gases by absorption in a wash liquor which contains ammonia and an iron or other metal compound. The sulphided liquor is distilled to recover the ammonia and is then aerated to regenerate the wash liquor. The ammonia required for the latter may be absorbed from the gas being purified, the process being carried out in apparatus as shown in the accompanying illustration. The process is direct ammonia recovery.

The gases from a battery of coke ovens pass up stand pipe 2 into collecting main 3 and then through mains 10, 11, 14 and 15 and manifold 16 to the primary cooler 17. Leaving the latter the gases pass through manifold 26 and then to either or both ammonia washers 27. Tar and ammonia liquor collect in a hot drain tank 5 and pass to separating tank 51, the tar entering the tank 52 and ammonia liquor collecting in tank 53. Instead of washing out the uncondensed ammonia in the scrubbers 27 with water, an aqueous suspension of hydrated ferric oxide is employed.

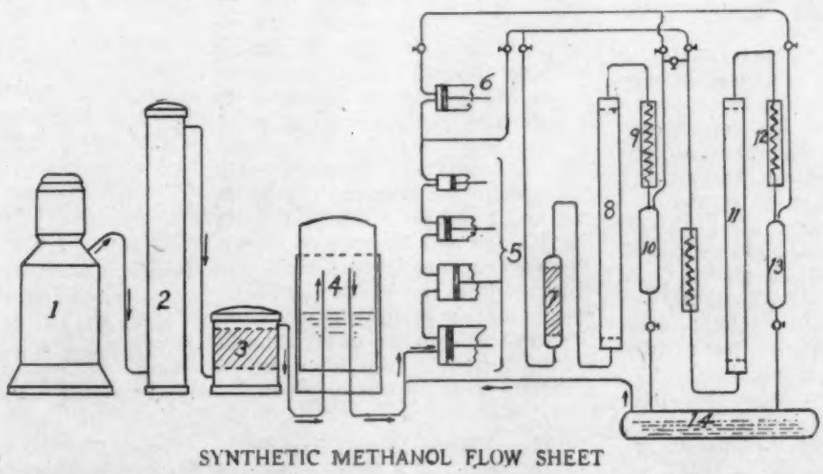


The ammonia and sulphuretted hydrogen are absorbed and the sulphided liquor passes through pipe 31 to an ordinary steam still 32, the ammonia being condensed in condenser 34 and collected in tank 37. The sulphided suspension leaves the still through pipe 38 and is regenerated in a thionizer 40. It is advantageous to provide baffles 80 and to subdivide the thionizer into compartments to facilitate cleaning. Air is supplied to the sulphided liquor in finely divided condition through fabric tubes. Sulphur collects as a foam and enters the trough 41, from which it may be led to a centrifuge. Flotation agents, for example kerosene may be used. The hot regenerated liquor is pumped to coils 45 cooled with water and thence through pipes 47 to scrubbers 27.

Instead of iron hydrate other metal compounds, for example of maganese, cobalt, nickel may be used but preferable in the form of hydroxide, carbonate or sulphide in order to avoid forming fixed ammonium salts. Soluble metal salts such as the chloride or sulphate may however be added merely to replenish losses. The ammonia liquor from tank 53 is pumped to the usual free ammonia still 58 with liming section and to the fixed ammonia still 60. The ammonia distilled over passed to the condenser 34. As ammonium thiosulphate and thiocyanate are formed in the washing liquor circulating between the scrubber and the regenerator, portions of it may be withdrawn by pipe 62 to still 58. British Patent No. 261,755.

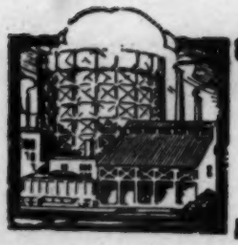
Methanol Flow Sheet

It has been deemed advisable to supplement the article, "Use of Off-Peak Water-Gas Capacity for Methanol Production," by A. C. Fieldner—see page 179, American Gas Journal, February 19, 1927—with an illustration of the Flow Sheet shown below. This is furnished by courtesy of Tech Engineering News, Massachusetts Institute of Technology.

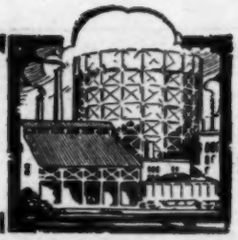


SYNTHETIC METHANOL FLOW SHEET

1. Water gas producer. 2. Scrubber. 3. Sulphur Compound absorber. 4. Gas holder. 5. Four stages of compression. 6. Circulating pump. 7. Charcoal filter. 8. First catalyst tube. 9. First condenser. 10. First receiver. 11. Second catalyst tube. 12. Second condenser. 13. Second receiver. 14. Synthetic Alcohol tank.



NEWS OF THE GAS INDUSTRY



Public Service Commission Approves Schedules

Albany.—The Public Service Commission has approved the following gas schedules:

Central Hudson Gas and Electric Co. Gas service supplied in city and town of Newburgh. Classification for use of service for fuel and heating to consumers who guarantee to pay for not less than 180,000 cu. ft. per year, canceled; effective January 19, 1927. No customers are taking service under this classification.

Goshen Illuminating Co. Gas service supplied in village of Goshen. Schedule effective January 21, 1927, provides block rates as follows for use of service for all purposes: First 400 cu. ft., $1; next 600 cu. ft., 25c per 100 cu. ft.; next 9,000 cu. ft., 23.5c per 100 cu. ft.; next 10,000 cu. ft., 22.5c per 100 cu. ft.; all over 20,000 cu. ft. per month, 20c per 100 cu. ft.; minimum charge of $1 per month per meter. Rate heretofore in effect: $2 per 1,000 cu. ft. for all gas consumed, subject to minimum charge of 60c per month; 5 per cent discount allowed for prompt payment of bills in excess of $1.

Lockport Light, Heat & Power Co. gas service supplied in city of Lockport. Schedule effective January 15, 1927, by special permission of the commission provides block rate (per 1,000 cu. ft.) as follows for use of service for industrial purposes: First 500,000 cu. ft., $1.50 gross, $1.40 net; next 500,000 cu. ft., $1.30 gross, $1.20 net; all over 1,000,000 cu. ft., per month $1.10 gross, $1 net; minimum charge $500 (net) per month. Bills rendered at gross amount and discounted to net amount if paid by the 10th of the month following that in which gas was used. Effects reduction of 10c per 1,000 cu. ft. on gas consumed in excess of 1,000,000 cu. ft. per month.

Rochester Gas & Electric Corp. gas service supplied in city of Canandaigua. Delayed payment regulation changed to provide an exception to take effect that an allowance will be made in the case of each customer to the extent of one failure (to pay bill when due) in each calendar year. Effective January 1, 1927, by special permission of the commission.

Syracuse Lighting Co., Inc. gas service supplied in city of Syracuse, village of Solvay, and towns of DeWitt, Geddes, Onondaga, and Salina, town of Geddes added to territory now served. Effective February 1, 1927. Rate (block) for service in town of Geddes is same as that applicable to service in other territory served by the company.

* * *

No Changes Made in Gas Pressures Here, Official Says

Quincy, Mass. — Commenting upon the fact that in connection with the recent change to the Malden and Melrose Company gas by the town of Wakefield and that in some cases the gas bills appear to be higher than normal, Vice-President John J. Quinn of the Citizens Gas Company, explained that no change in pressure has been effected in this city and that there is no necessity for readjustment of individual appliances in order to be "in tune" with the pressure.

According to Mr. Quinn, the town of Wakefield recently decided to discontinue the manufacture of its gas and purchase its supply from the Malden and Melrose company. The various constituents of the gas obtained from the Malden and Melrose company varied slightly from the content of the gas formerly manufactured by the town and a different pressure was originated.

* * *

Gas Plants May Expand

Cincinnati, O.—Equipment of gas plants at Coke Otto may be increased $1,000,000 if Hamilton accepts a proposal the Hamilton Furnace Company has made to furnish the city gas, John A. Savage, president, told Hamilton Rotarians.

GAS GROUP NAMES GOULD OF BOSTON

Is Elected President At Worcester Session

Worcester, Mass.—The New England Gas Association in its annual convention here elected William Gould of Boston, president; G. W. Stiles, of Portland, Me., and J. J. Quinn, of Quincy, as vice-presidents; S. D. Cadwallader, of Boston, treasurer; Francis Bell, of Boston, and Alexander Macomber, of Charlestown, directors.

The operating division elected A. H. Scott, of New Britain, Conn., president, and F. E. Drake, of Lynn, secretary.

The prizes for 1926 offered by the Board of Governors of the association were awarded as follows:

For excellence in sales promotion, to the Leominster Gas Company; in room heater contest, to New London Gas Company; in tank heater contest, to Pittsfield Coal Gas Company; in range contest, to Woburn Gas Company.

Addresses were given by E. W. Berchtold, sales manager of the Boston Consolidated Gas Company, on "The Use of Process Steam in Industry"; John A. Keene, sales manager of Hambleton Co., Inc., on "Sales Department Personnel," and Roy Simpson, of the Liggett Stores, on "Merchandising and Advertising."

The addresses were followed by general discussions. The delegates had a banquet and dance.

* * *

Pacific Coast Representative for Ice-O-Lator Appointed

New Haven, Conn.—Mr. John C. Douglas has been appointed Pacific Coast representative on the Ice-O-Lator, an absorption type electric and gas-operated refrigerator built by the National Refrigerating Company of New Haven, Conn.

Mr. Douglas is well known in the specialty trade along the Pacific Coast, and has been closely associated in selling to the public utility companies for the past ten years.

NEW RECORD SET BY GAS COMPANY

Increased Consumption Is Shown in All Divisions

Worcester, Mass.—With a production of 1,225,911,000 cubic feet of gas in 1926, The Worcester Gas Light Co. reached a new years' record for its entire history in a period that also saw eight months when its production passed the 100,000,000 mark.

The record breaking year was due, officials of the company declared today, to increased consumption in each of its divisions, industrial, house heating and domestic, the increased consumption in the industrial division being a reflection of the general prosperity of the city's factories and mills.

In 1924, the production was 1,009,900,000 cubic feet of gas, and in 1925 it was 1,142,488,000 cubic feet. Of the latter 1,072,940,000 was actually consumed by customers, the remainder being the company's consumption, and loss through leakage and in other ways.

December saw a production of 108,449,000 cubic feet compared to a production of 100,074,000 for the same month in 1925.

The largest production month in the company's history was September with 111,000,000 cubic feet, 4,000,000 more than any previous month.

The industrial consumption for 1926 will reach 225,000,000 the company believes, compared to 210,391,500 for 1925 and 184,555,200 for 1924.

The largest customer of the company continues to be the American Steel & Wire Co. mills. They consumed 48,000,000 the first 11 months of the year, and in the whole of 1924 used 16,587,800 and in 1925, 36,426,000 cubic feet.

New home heating gas fired boilers also bought a sizable share of the increase as many of these were put in during the year.

* * *

May Sell Lowell Gas Co.

Lowell, Mass.—Director of the Lowell Gas Light Company announce that an offer has been received from Estabrook & Co., of Boston, for the purchase of a controlling interest in the capital stock at a price of $80 a share. Its acceptance is recommended in a letter to stockholders from George S. Motley, president, and the directors. If the sale is consummated the company will be placed under the management of Stone & Webster, Inc., who now manage the Lowell Electric Light Corporation.

Convention Calendar

March

8-10—Oklahoma Utilities Association. Annual meeting, Huckin Hotel, Oklahoma City. E. F. McKay, manager, Oklahoma City, Okla.

10-11—Empire State Gas and Electric Association. Annual meeting, Gas Section, Briarcliff Lodge, Briarcliff Manor, N. Y. C. H. B. Chapin, secretary, Grand Central Palace, New York City.

17-18—Illinois Gas Association. Annual convention, Springfield. R. V. Prather, secretary, Springfield, Ill.

April

4-5—American Gas Association. Distribution Conference of Technical Section, Baltimore, Md.

6—Pennsylvania Gas Association. Annual meeting, Bellevue-Stratford Hotel, Philadelphia, Pa. G. L. Cullen, secretary-treasurer, Harrisburg, Pa.

7-8—Eastern States Gas Conference. Annual meeting, Bellevue-Stratford Hotel, Philadelphia, Pa. J. Calhoun Smith, secretary, Reading, Pa.

7-8—New Jersey Gas Association. Annual meeting, Bellevue-Stratford Hotel, Philadelphia, Pa. Louis Stoker, secretary, Newark, N. J.

19-22—Southern Gas Association. Annual meeting, Biltmore Hotel, Atlanta, Ga. J. P. Connolly, secretary, 141 Meeting Street, Charleston, S. C.

20-22—Midwest Gas Association. Annual convention, The St. Paul, St. Paul, Minn. H. R. Sterrett, secretary, 551 Seventh Street, Des Moines, Iowa.

26-29—Southwestern Public Service Association. Annual meeting, New Orleans, La. E. N. Willis, secretary, 403 Slaughter Bldg., Dallas, Texas.

GAS COMPANY LETS NEW PLANT CONTRACT

Plans Completion of New Ovens By September

Adrian, Mich.—With plans approved and the construction let the new gas making plant to be installed by the Citizen's Gas Fuel Company as an important part of its new building program is fast materializing. The ground for the foundation of the new building, which is to be of brick and steel, will be broken as soon as weather conditions permit, Dean E. Byerley, vice-president and general manager, stated.

The contract for the building of the structure has been let to the Improved Equipment Company of New York City, although the foundation is to be built by the Adrian Company. In size it is to be 70 by 85 feet and 75 feet high, containing the improved equipment which is to have 50 per cent more capacity than the old plant, requires only five men to operate while the present plant requires 18 men's help. It is expected the new plant will be completed by September 1.

The new gas holder which has been in the process of construction for the last few weeks is nearing completion and it will be in operation by February 10. This new container holds 200,000 cubic feet of gas, while the three old tanks have a combined capacity of 160,000 cubic feet. With this new holder and the installation of the gas "shooter" which is a pump to force the gas from the holder through the mains, the service pressure throughout the city will be greatly increased.

The Southern District comprises the Gas Light Company of Augusta, Augusta, Georgia; Valdosta Gas Company, Valdosta, Georgia; Tri-City Gas Company, Gadsden, Alabama; Concord & Kannapolis Gas Company, Concord, North Carolina; Gastonia & Suburban Gas Company, Gastonia, North Carolina, and Suffolk Gas and Electric Company, Suffolk, Virginia.

Mr. Crawford has established district headquarters at Augusta, Georgia, and will soon move his family there making Augusta his home.

Lower Heat Units to Boost Gas Bill

Three minutes longer flow of gas through the family meter will be required for each operation by Chicago housewives in preparing meals for their families if the proposed reduction of heat units in Chicago gas becomes effective.

Reduced to kitchen parlance, it is quite generally accepted that the present grade of gas furnished Chicago consumers will cook potatoes in twenty minutes. If the number of heat units in this gas is reduced 15 per cent, the time required to cook the potatoes will be increased about 12 per cent or approximately three minutes. This three minutes additional use of gas burners for each of the various activities in the home, would make a noticeable increase in all gas bills at the end of each month, it is pointed out by C. C. Hotchkiss, city public service engineer for the city council committee on gas, oil and electricity.

"Experiments conducted by the United States bureau of standards show that the same efficiency may result from lower heat units, but that the volume of gas used is increased in proportion to the reduction in heat units," said Mr. Hotchkiss recently, "As Chicago gas consumers pay on the volume of gas passing through their meters, a reduction on the number of heat units in the gas furnished means an increased flow, therefore a larger bill.

"It should also be remembered that if a reduction of heat units is allowed, there will have to be a readjustment of gas appliances in homes, that they may produce the best results and also may be safe."

This increase in Chicago's gas bills will come if the Illinois commerce commission grants the petition of the Illinois Gas Association for a 15 per cent reduction in the number of heat units of gas.

For the last seven years Chicago gas has contained 535 British thermal (heat) units, the amount fixed by state standards. Now a movement has been launched by some of the gas companies to have the standard reduced in order, so they assert, that they can use Illinois coal and help the Illinois coal miners. It is said that while Illinois coal is not so good for gas-making purposes as coal from other states it can be used if the commerce commission will permit a 15 per cent reduction in the number of heat units.

Such a reduction in the number of gas units may be all right, in the opinion of Donald S. Richberg, representing the city as attorney in the gas case, but he insists that the gas companies' move is to effect a saving for them in production and that the gas consumer should receive a corresponding reduction in his gas bill.

Penn Central to Erect Gas Plant At Lewistown

Altoona, Pa.—J. H. Shearer, vice-president and general manager of the Penn Central Light and Power Company, has announced that a contract has been given by the company amounting to approximately $500,000 for the erection of a new and complete gas plant at Lewistown. Mr. Shearer said that the company had been forced to provide greater capacity in gas facilities at Lewistown because of the rapid growth.

The Western Gas Construction Company, of Fort Wayne, Indiana, was awarded the contract, and local contractors will probably be affected in regard to sub-contracts.

The site of the new plant is located in the bend of the river at the foot of Fleming avenue in the Hollywood district.

It is reported construction work will begin at once on the new plant which may be in operation by September. The foundations will be immediately opened and the artesian well for water supply will be drilled.

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Commonwealth of Massachusetts, Memo on Gas House Heating

Boston, Mass.—House heating with gas is only in the experimental stage, but from a recent survey made by the commission it appears that installations in Massachusetts of central gas heating plants increased from about 300 a year ago to about 1,000 at the present time.

The following table illustrates the growth that is taking place in the use of gas for house heating:

House Heating Gas Installations

	Winter 1925-26	Winter 1926-27
Boston	32*	177
Worcester	34	91
Springfield	22	70
Fall River	53	110
Haverhill	108	174
Brockton	25	65
Lynn	3	50
Holyoke	0	10
Lowell	6	41
Malden	14	36

* Prior to August 1, 1926.

Koppers Construction Company Receives Contract for Brooklyn Union Gas Co. Plant

The Koppers Construction Company has been awarded a contract for the design and erection of a by-product coke and gas plant for the Brooklyn Union Gas Company at Brooklyn, N. Y.

This plant will consist of seventy-four Becker type combination coke and gas ovens and nine Koppers gas producers, with a complete coal and coke handling system, and complete equipment for the recovery of by-products. The plant will have a capacity of 1,750 tons of coal per day and a gas output of 20,000,000 cu. ft. per day.

Rome Power Holdings Change Ownership

Rome, Ga.—Property of the Home Municipal Gas Company recently changed hands, being taken over by the Central Public Service Company, Chicago, Ill., and Georgia Public Service Commission announced. The consideration involved in the purchase was not made known.

The new company owns and operates gas plants also at Augusta, Griffin, Valdosta and Waycross.

The plant at Rome is to be rebuilt and approximately $75,000 in improvements installed immediately, it is understood.

BIG INCREASE IN GAS PLANT RETURNS

Sanford Report Will Show Municipal Ownership Has Been Success

Sanford, Fla.—Earnings of the municipal gas and water plants during January showed a big increase over the same month of 1926, according to the report compiled by City Manager W. B. Williams, for presentation at the next meeting of the city commissioners.

In the gas department, the report shows, the earnings over cost of operation, for the last month, were $2,361.15, as compared with $1,243.79 for the same month of 1926, an increase of $1,117.36. There was an increase of twenty-seven in the number of gas customers during the month, bringing the total number to 1,334, as compared with a total of 1,076 in January of last year.

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WINSTED GAS CO. APPEALS AGAIN

Appeal From Last Year's Valuation Still Unsettled

Winsted, Conn.—The Winsted Gas Company for the second year has appealed to the Colebrook board of relief from the assessment of $49,000 made by the assessors in that town. The assessment is placed on the water power rights owned by the gas company at Tunxis Falls, Robertsville. The power rights were first assessed last year and an appeal was taken to the superior court and later to the supreme court, where it is now pending. The grand list of Colebrook this year is $1,041,973 or about $44,000 more than last year. This is the first time that the grand levy has reached the million-dollar mark.

* * *

NEWBERRY SEEKS LARGE INDUSTRY

New York Gas Corporation Interested in City of Friendly Folks

Newberry, S. C.—A large corporation of New York City is interested in locating a gas plant here to furnish gas for heating and lighting purposes in this city.

This concern has been in correspondence with the secretary of the local chamber of commerce for some time and will send engineers here to make a survey at an early date, according to information from J. P. Moon, secretary, chamber of commerce.

* * *

Installation At Adrian, Mich.

The Improved Equipment Company has also received a contract to build for the Citizens Gas Fuel Company, Adrian, Michigan, a complete new carbonizing plant which will include the "Improved" horizontal gas ovens of the three section type, having a daily rated capacity of 600,000 cu. ft. of gas. The Adrian plant will be similar to the plant built by The Improved Equipment Company in Danbury, Conn. After two years continuous operation of the ovens in Danbury, it was not found necessary to change the design of these ovens in any respect. The Adrian plant will comprise of coal and coke handling equipment, twelve ovens with their requisites, coke quenching and coke handling apparatus. This plant will be in operation about the middle of this summer.

The gas works in Pontiac, Mich., has in use sixty ovens of the "Improved" three sectional type and The Improved Equipment Company has received a contract to reconstruct 18 ovens, following their standard design.

At the plant at Danbury, Conn., The Improved Equipment Company are adding three additional ovens to the battery of twelve "Improved" horizontal gas ovens originally built by them. Construction work is now in progress.

There continues to be a demand for the standard silica retort benches equipped with The Doherty Bench Fuel Economizer as evidenced by the orders The Improved Equipment Company has under construction or in the process of manufacture for early delivery for retort bench work in the following towns: Lewiston, Idaho; North Yakima, Wash.; Eau Claire, Wisc.; Ogdensburg, N. Y.; Philadelphia, Pa.; Faribault, Minn.; Defiance, Ohio; Denver, Colo.; Grand Junction, Colo.; and Salem, Oregon.

C. C. Murphy Heads Water Heater Department of Indiana Gas Utilities

Indianapolis, Ind.—C. C. Murphy, of Chicago, has been named to take charge of the gas water-heater department of the Indiana Gas Utilities at Terre Haute, according to an announcement by officials of the company. Mr. Murphy has spent four years in the Premier heater division of the Crane Co., and will have charge of the installation, sale and service of heaters for the Terre Haute plant. Officials of the gas company say particular stress will be laid on the service end of the business.

* * *

Export Coal for Gas Manufacture

Chicago.—The Bell & Zoller Coal Company, Chicago, Ill., claim a unique distinction for their "Genuine Zeigler" coal, in that it is the only coal that has ever been exported to Europe from the state of Illinois to be used in the manufacture of gas. Their mines are located in Southern Illinois and have a daily capacity of 18,000 tons.

Shipments were made to Havre, France, and Genoa and Savona, Italy.

* * *

Fined for Refusing Gas Company Access to Meter

Brooklyn.—Charles Lovell, 47 Putnam Avenue, was convicted in the Court of Special Sessions and fined $50 for refusing the Brooklyn Union Gas Company access to its meter in the cellar of his home, which supplied his house with gas.

Representatives of the company went to this address several weeks ago. They demanded the right to inspect the meter and were ordered out of the premises by the defendant. Lovell was arrested and charged with a misdemeanor in refusing the gas company access to its meter. The company desired the inspection of the meter for the purpose of protecting its property and seeing that all of the connections were in order.

A warrant for the arrest of Lovell was issued by Magistrate Brown, who, on examination, held him for the Court of Special Sessions. The prosecution was conducted by the district attorney's office, Assistant District Attorney Charles Cohn being assigned for that purpose.

American Gas Construction Company Plans to Broaden Its Scope Shortly

Newton.—The pioneer work of the upbuilding of the American Gas Construction Company, one of the thriving industrial associations of Newton, was accomplished, to a great extent, by D. C. Tenney and C. I. Tenney, who came to Newton in 1907 at the instigation of F. L. Maytag, at that time one of the board of directors.

Later D. C. Tenney and C. I. Tenney, with R. S. Redman, purchased the interests of F. L. Maytag and his associates and have been in control of the business since that time. Owing to the death of Mr. Redman last summer the company wil reorganize soon and will supplement the construction of water gas works with new industrial and manufacturing lines, among which will be a gas fired house heating furnace.

C. I. Tenney has recently developed a subsidiary finance company which in the last three months has bought six complete gas companies and has contracted with the American Gas Construction Company for the erection of two complete gas works and gas mains installations. These works and installations will go in at Scotts Bluffs, Neb., and Minot, North Dakota.

The company has for some time operated extensively in Florida, where they also plan other large installations. In New York they are under contract for the building of gas works under control of the General Electric Company and the Adirondack Electric Power Corporation. Clifford Manning is now located at Hudson, N. Y., in the interests of the company.

Mr. Tenney announces that valuable patents have recently been secured covering the more economical production of carborated water gas.

Closely associated with the company and acting in an advisory capacity is A. H. Bergman. The company anticipates a business this year totaling $1,000,000.

Chicago Utility to Ask Gas Franchise at New London Meeting

New London, Wis.—Whether New London is to have gas numbered among its public utilities will be threshed out at the meeting of the city council. The project was introduced by two representatives of the Great Northern Utilities Company of Chicago who met informally with Mayor E. W. Wendtlandt and the board of public works. When asked by the city officials how the company proposed to lay the gas mains under concreted streets the representative stated that they would use alleys whenever possible, and in other cases they would run the mains beneath sidewalks and curbs.

The companys' representatives also stated their willingness to post a $10,000 surety bond to the effect that any damage done to streets by laying their gas mains would be repaired to the city's entire satisfaction.

New London has not enough consumers for a gas plant at present, however the Northern Utilities representatives would use this city as a central gas plant and their plans are to furnish gas to Clintonville, Waupaca and nearby towns adjacent to this community. This would be another step in the right direction, according to many people, as gas as a fuel has long been desired. The fact that New London would be the central point would mean that most of the men employed by the company would be kept in this city.

Rates would be determined by the state railway commission the same as in the case of electric lights and power. Considerable money would be spent for local labor in the construction of this plant and the installation of the gas mains.

Minimum Gas Bill of $1 Month Asked As Aid to Industry

Minneapolis, Minn.—Bills of 25,000 of the smallest gas consumers in Minneapolis will be nearly doubled if a proposal now before the city council goes into effect. These are bills that now amount to not more than 50 cents a month.

The Minneapolis Gas Light Company proposes that the minimum gas bill be $1. Twenty-two per cent of those using gas in Minneapolis pay less than 60 cents a month, gas company officers estimated today. That means approximately 25,000 homes, apartments or rooms.

The new proposal was offered in connection with the demand for step rates for extensive users of gas for industrial or heating purposes. Those using large quantities would get reduced prices under the plan. The gas company served notice it must have a new franchise and must have a minimum charge of $1 if step rates are to be put into effect.

"We lose money on small accounts," Arthur H. Rand, president, said. "If the bill is 60 cents or less, we are giving the service at a loss, which affects the price of all gas. The cost of meters and mains and all the service in connection with furnishing gas makes it impossible to come out even on small accounts."

Fixing a minimum, so these smaller accounts would not have to be carried at a loss will make step rates possible, Mr. Rand said. If bills of the 25,000 are increased 40 cents a month, on the average, it will add $120,000 to annual revenues of the company.

The gas company's mains now have been extended to Richfield, Morningside, Edina and the Country Club district, Mr. Rand said. In Richfield the mains extend virtually to the limits of the area proposed for annexation to Minneapolis.

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Cruse-Kemper Co. Awarded Holder Contracts

Ambler, Pa.—Contracts have recently been booked for a two million cu. ft. gas holder for Pennsylvania Gas and Electric Company, to be erected for the York Gas Company, at York, Pa., and a 500,000 cu. ft. holder for the United Gas Improvement Company, to be erected at Richmond Works, Philadelphia.